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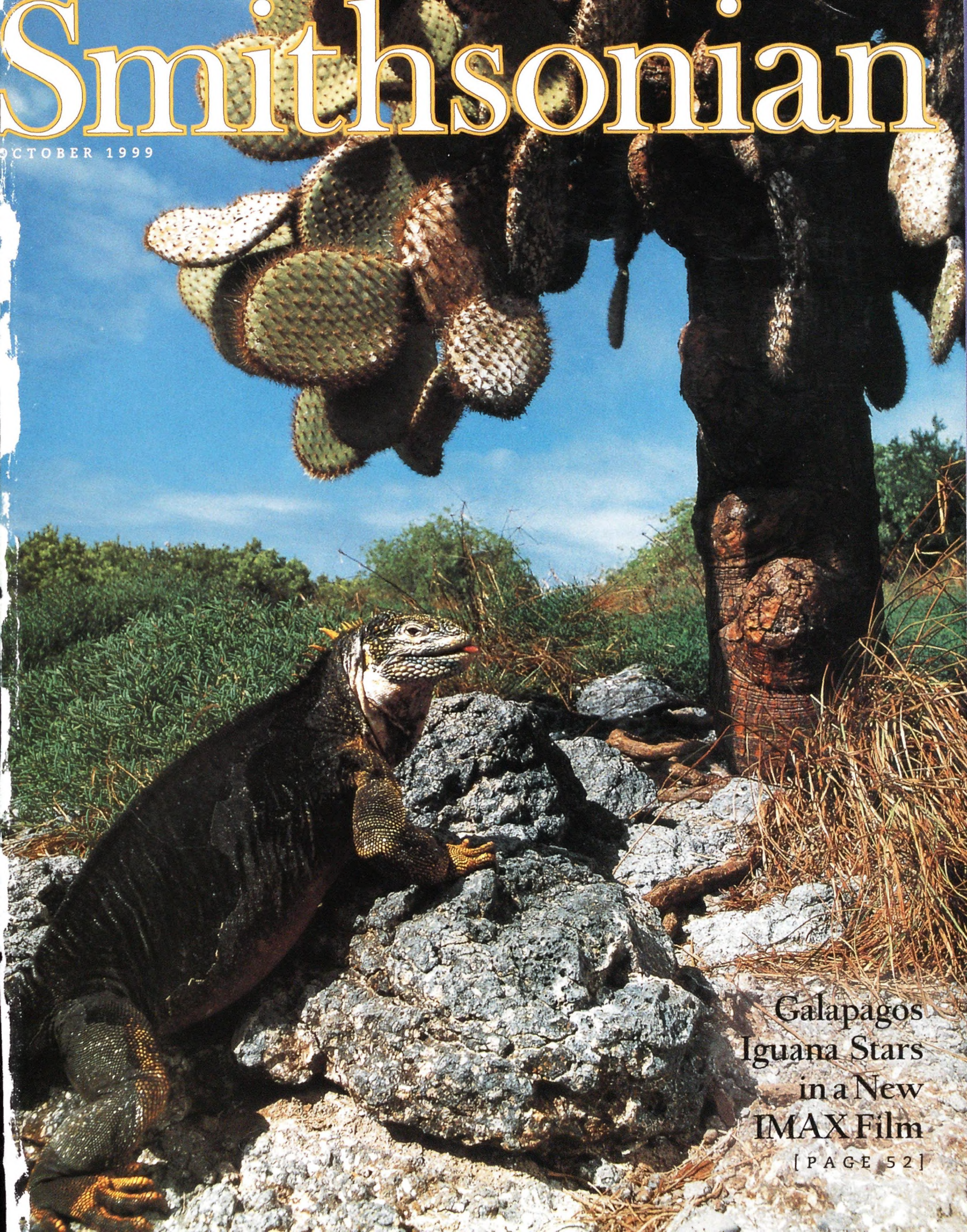

Galapagos Iguana Stars in a New IMAX Film

[PAGE 52]

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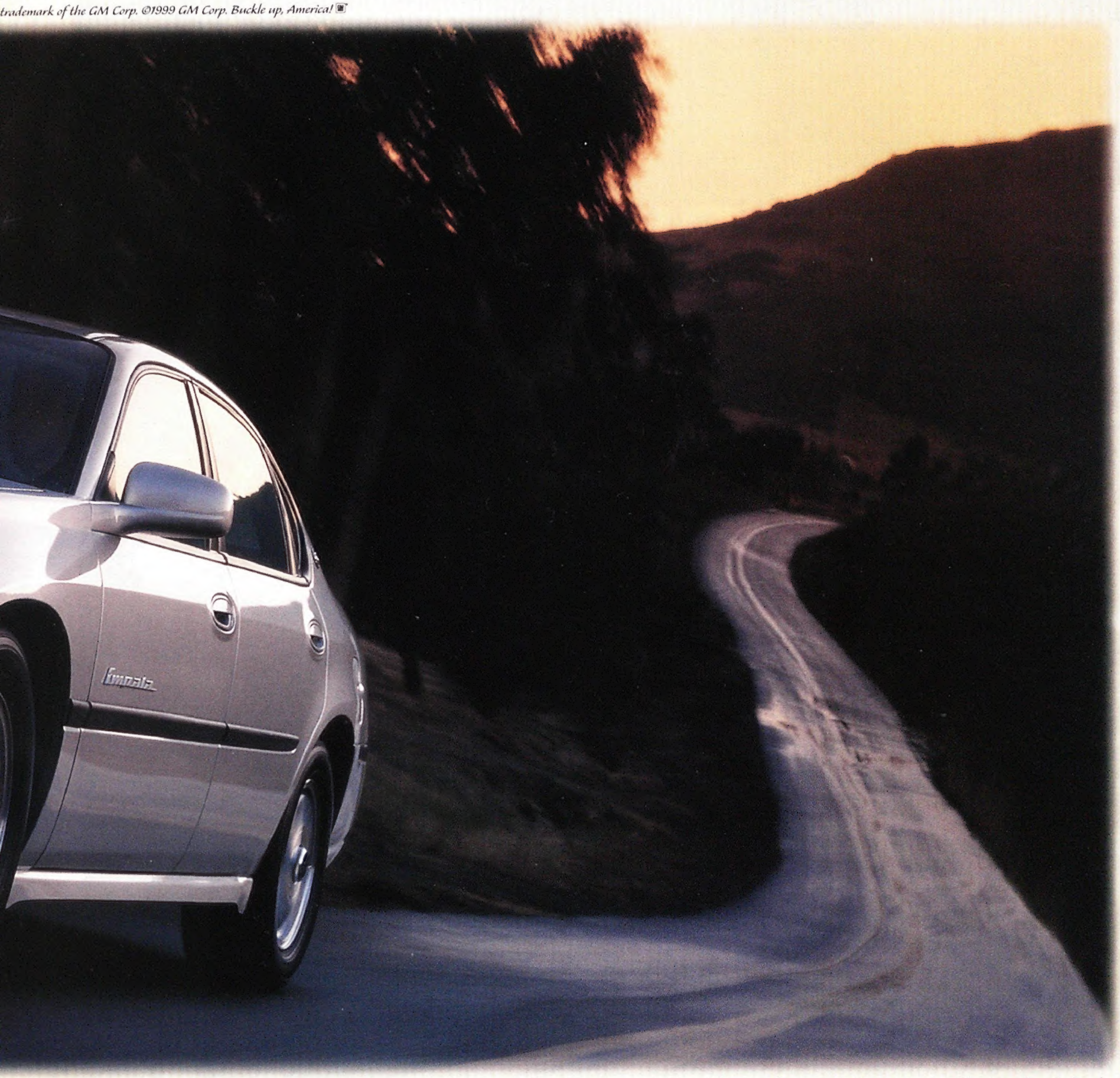

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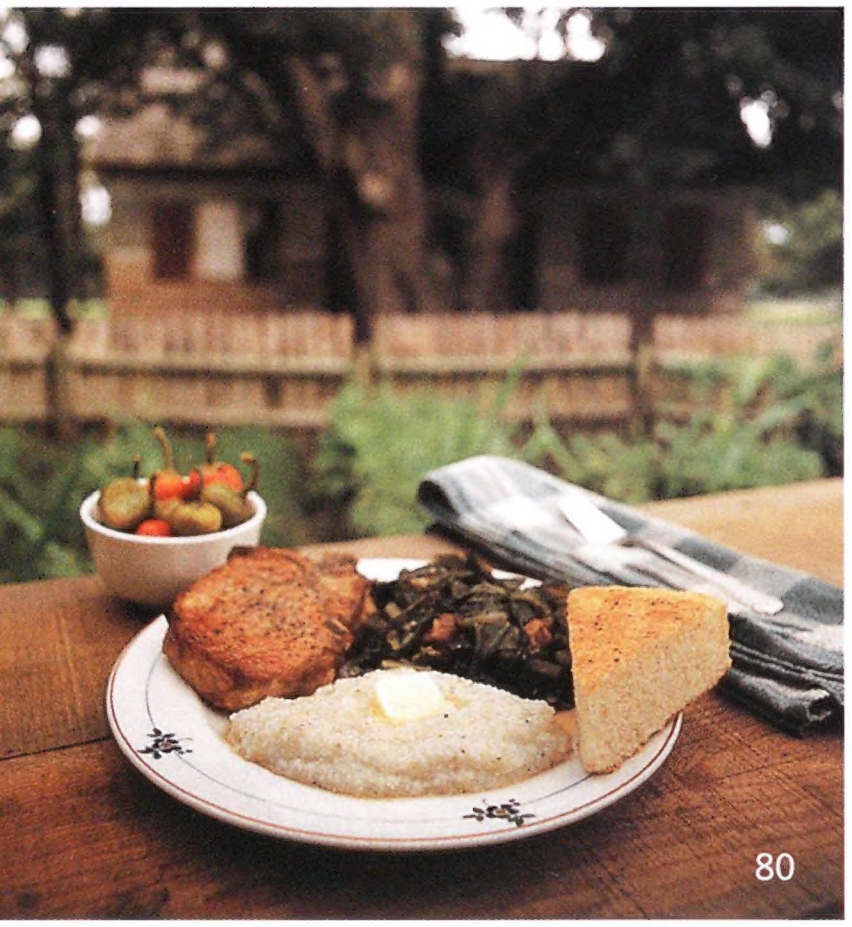

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departments

OCTOBER 1999 VOLUME 30, NUMBER 7

Cover A land iguana seeks the shade of a prickly pear cactus on Plaza Island in the Galápagos. So abundant were the reptiles when Darwin visited in 1835 that, he wrote, "we could not . . . find a spot free from their burrows on which to pitch our single tent."
PHOTOGRAPH BY IMAX CORPORATION

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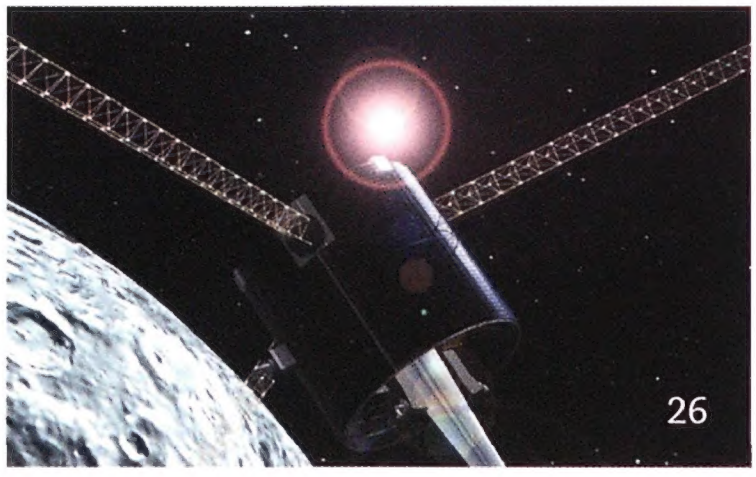

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To create an exceptional class just add water.

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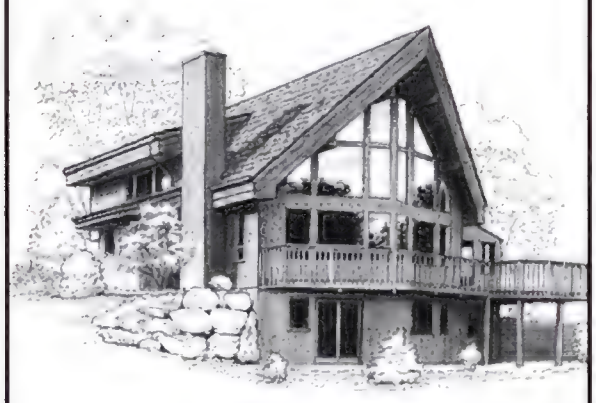

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SMITHSONIAN PERSPECTIVES

Two for the Road

CHANGES MEAN A BRIGHT FUTURE FOR THE NATIONAL MUSEUM OF AMERICAN ART AND THE NATIONAL PORTRAIT GALLERY

I HAVE BEEN USING MY COLUMN AS I CONCLUDE MY term as Secretary to reacquaint SMITHSONIAN readers with the Institution's many museums and research centers. Their breadth and quality deserve reiteration as we prepare for our first modern-day capital campaign to raise the private support necessary to ensure continued excellence.

Today the focus is on two museums—the National Museum of American Art and the National Portrait Gallery—which share the Old Patent Office Building, an important historical landmark near the Mall. The building is scheduled for a massive renovation, beginning in January 2000, and both museums will be sending major exhibitions around the United States while it's closed. In addition, the Old Patent Office Building houses the Archives of American Art with its vast holdings of documentary materials on American art and artists.

The National Museum of American Art (NMAA) contains a broad collection of American painting, sculpture, graphic art, photographs and folk art from the 18th century to the present. It has more than 38,000 works and a major center for scholarly studies. The latter includes such unique resources as the Inventory of American Sculpture, with information on 75,000 indoor and outdoor works.

NMAA's collections have nearly doubled in the past 25 years. Among the major pieces are the approximately 500 Indian paintings of George Catlin, a large group of paintings by Albert Pinkham Ryder and extensive collections of the art of the 1930s and of works by African-Americans. NMAA also displays both portions of its collections and many of its exhibitions on-line.

The National Portrait Gallery (NPG) is the only major museum in the Western Hemisphere devoted exclusively to portraiture. Established by Congress in 1962 to collect, exhibit and study portraits of "men and women who have made significant contributions to the history, development, and culture of the people of the United States," the collection highlights Presidents and other Americans prominent in government, science, the military, literature, theater, the arts, sports: people who represent all aspects of life. For me, NPG is principally a museum of biography—a place where American history and culture can be understood through individuals seen amid the context of their times. For example, among recent NPG exhibitions, "Red, Hot & Blue" presented the story of the American musical, with an all-star cast of the singers, actors, dancers, producers and authors who created the hits. Some exhibitions tell the history of one great American life in depth; for example, the current "Picturing Hemingway." Others have explored the lives and work of such portraitists as painter Cecilia Beaux, sculptor Marisol and photographer Annie Liebowitz. Also a resource for scholarly studies, NPG contains the Catalog of American Portraits (photographs and documentation of portraits of noted Americans in public and private collections throughout the country).

Both NMAA and NPG produce scholarly publications and maintain extensive educational and outreach services for many different audiences.

These two museums are on the brink of an exciting future. Three major changes now occurring will have profound influences. First, the neighborhood around the Old Patent Office Building is undergoing rapid private redevelopment and is clearly on the way to being a vital urban area. The second change is the renovation of the building itself, which will cost in excess of $60 million (largely federally funded). We will probably be able to add 60,000 square feet of public space by providing space for most staff and services elsewhere. This will enhance exhibition opportunities and provide more space for shops, educational activities and dining facilities. Lastly, that expansion space is now largely ensured by the Smithsonian's acquisition of a building currently under construction. The building is to be owned by the Smithsonian without additional federal funding for acquisition or operations. We must raise $35 million to fund the move from the Old Patent Office Building. I am optimistic, especially given a few large pledges already received from Commissioners of the NMAA. Space in the new building will permit NMAA to establish an American Art Center, to give the public and scholars access to research materials and study collections.

The cooperation of present and future donors can ensure a vibrant future for the activities now occurring in both museums and the Archives.

I. Michael Heyman

I. MICHAEL HEYMAN, SECRETARY

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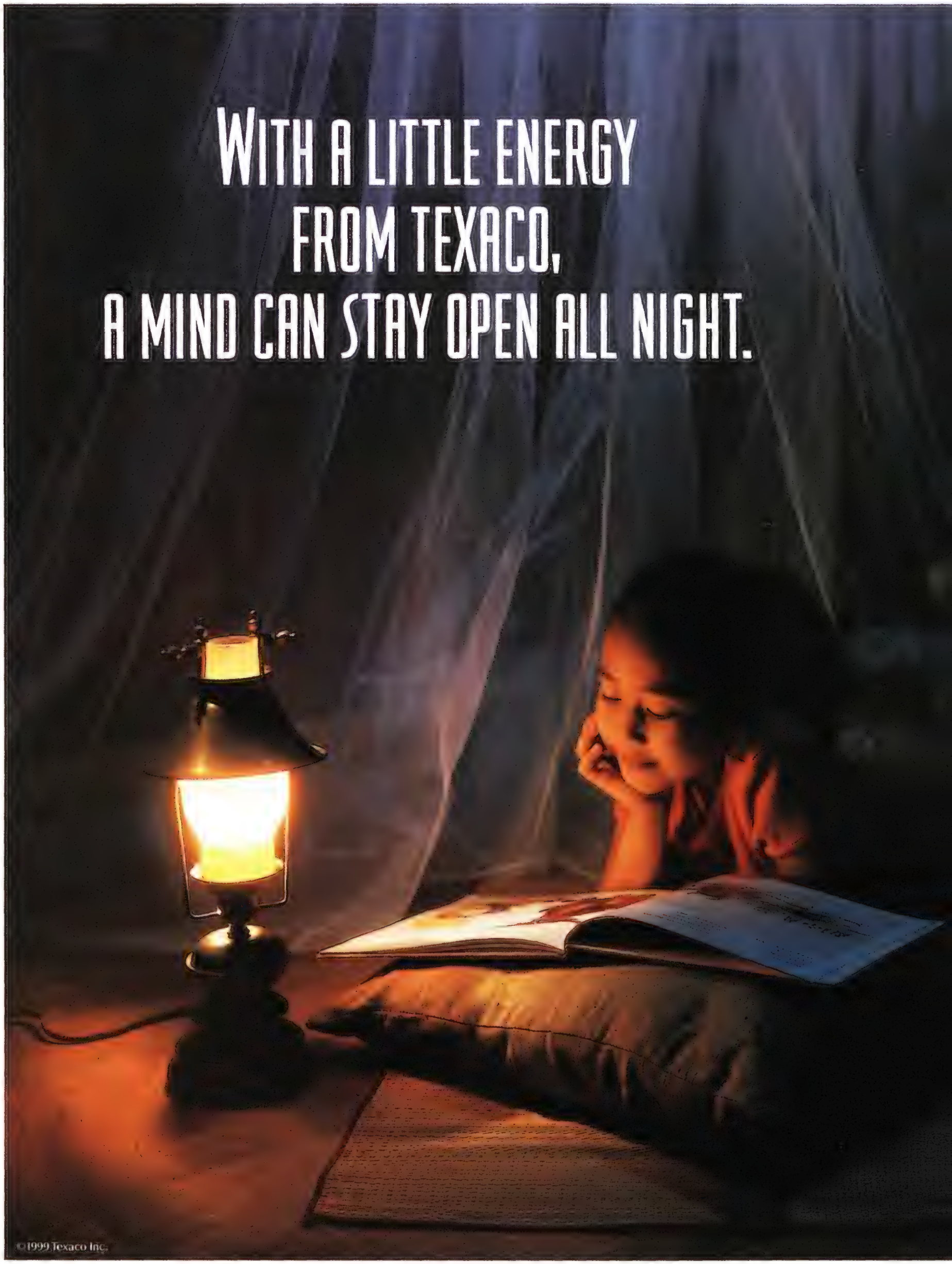

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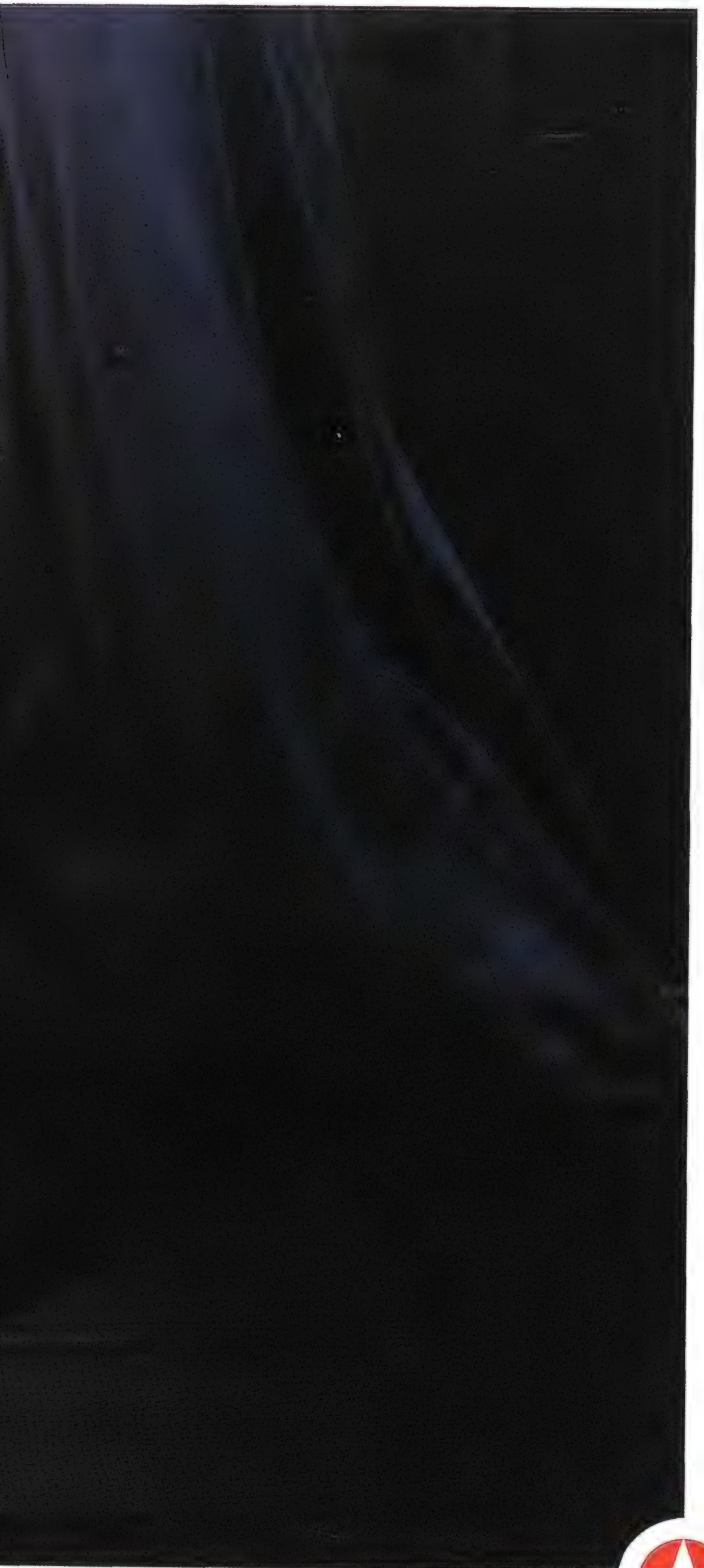

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CHECKERS

THE ARTICLE ON CHECKERS BY TIM Hensley, in the August 1999 issue, brought back fond memories of the game. When I was about 7, I was a member of Boys Club No. 5 on the southwest side of Chicago. A 12-year-old braggadocio outplayed all of the competition at the club. He laughed and hooted while playing and made crass remarks about anyone he beat.

I decided that I would get him.

Whenever he was playing, I silently watched and studied his moves. His basic strategies were the two-for-one and the three-for-one, especially in the early part of the game. After a few months, I challenged him to a game. He made a number of crude comments about my youth, so in front of the other club members, I called him chicken. To save face, he agreed to play me.

He did not know how to defend against his own offensives. Plus, I had the element of surprise, since he never suspected that a boy so young could figure out his traps. He did not go down in ignominious defeat, however. After falling for a three-for-one trap I had set up, he picked up the board and threw it across the room, all the while cursing and screaming. We never again saw him at the club.

Charles J. Jacklin
Madison, Alabama

THE CHILDREN OF HENRI MATISSE are playing "the game of ladies" (*le jeu de dames*) not "women" (*femmes*), as translated in the caption beneath *The Painter's Family*. In Germany, by the way, checkers is called *Damenspiel*, and what we would refer to as a king, they call a *Dame* or lady.

Neil E. Matthew
Tucson, Arizona

TIM HENSLEY DID NOT MENTION HIS grandfather by name, but from the 1989 date of the world match against Marion Tinsley, it must have been Paul Davis. I beat Paul in the 1988 American Checkers Federation National Tournament but messed up later against a worthy opponent whom I had defeated in previous contests. Paul won the nationals, to everyone's surprise, including his own, which automatically gave him the right to challenge the reigning champion, Tinsley, in 1989.

Leo Levitt
Northridge, California

Paul Davis is the checker-playing grandfather of Tim Hensley. Ed.

TURQUOISE

I LOVED "TANTALIZING TURQUOISE" by Joseph A. Harriss, but you did not identify the the sources of the cabochons on pages 70 and 71.

Beverly Strohl
San Diego, California

The stones belong to the Turquoise Museum in Albuquerque, New Mexico. They are named for the mines from which they come, and those pictured include Enchantment from New Mexico, Manassa from Nevada, Sleeping Beauty from Arizona and Fox from Nevada, as well as stones from other U.S. mines. Ed.

WE HOPE YOUR READERS WILL VISIT the Turquoise Museum, where they can see the cabochons, the Navajo squash blossom necklace, the oyster shell pendant and the bracelets that were shown in the article as well as many other examples of turquoise from around the world.

Joe Dan Lowry
Turquoise Museum
Albuquerque, New Mexico

WHEN I BEHELD MAGGIE STEBER'S cover photograph of several magnificent pieces of turquoise jewelry, I was instantly transported home. I grew up a stone's throw from Santa Fe, New Mexico, and turquoise has always been part of my life. Softer, pure silver settings for the turquoise stones were common when I was a child in Los Alamos, but they were, unfortunately, easily broken. Since they could be replaced at nominal prices, the broken pieces of turquoise jewelry were commonly discarded by some

MAGGIE STEBER/SABA

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people I knew. Given today's high prices, it might be worthwhile to mine the landfill at Los Alamos.

Thomas J. Munyon
Lynnwood, Washington

THE NATIVE AMERICANS WHO ARE customers of trading-post owner Ellis Tanner, in Gallup, New Mexico, are the Acoma, not the Acama. The Acoma create wondrous pottery, and I am privileged to own a few pieces.

Leslie S. Rivau
San Jose, California

YEAR A.D. 1

LIONEL CASSON'S LATEST ARTICLE, "In the Year 1, Augustus Let the Good Times Roll," was both informative and entertaining. In these days of revisionist drivel, it was refreshing that someone wasn't demonizing our Roman heritage.

I will always appreciate more articles on the ancient world.

Steven Guardala
Stony Brook, New York

A.D. 1 TO A.D. 1999 DOES NOT EQUAL 2000 years. I wish everybody would stop listening to the marketing people, do the simple arithmetic and admit that we're all a year short.

Christopher Tiffany
Chicago, Illinois

EVER WONDER WHY IN THE TITLE OF his classic novel *2001: A Space Odyssey*, Arthur Charles Clarke chose 2001 and not 2000?

Brian Saari
Manassas, Virginia

JAVELINAS

MY BROTHER BILL HAD JUST STARTED working on the police force of a town near San Antonio when he received word that the residents of one of the neighborhoods wanted an officer to deal with a pig that had wandered into their yards. We grew up on a farm, so Bill wondered what all the fuss was about. He walked over to the strange-looking pig, picked up a nearby tree branch and prodded the animal, just as he had done when he wanted his 4-H project pig to move. This pig snapped the thick branch in two and came straight for him. My brother emptied his revolver into the pig, firing his weapon for the first time in his career. The game warden who arranged to dispose of the body gave Bill a lecture on javelinas: "Shoot first; ask questions later."

Bill heard later that the word had gone out among the toughs in town: "Don't mess with the new officer. He's not even afraid of javelinas. Just takes a stick to them!"

Kathleen Dawson
Englewood, Ohio

THE HERD OF JAVELINAS ON PAGES 54-55 was photographed at the Living Desert Zoo and State Park just outside Carlsbad, New Mexico, not on a Texas riverbank.

Alan Hall
Albuquerque, New Mexico

MONTPELIER HIGH SCHOOL

RICHARD AND JOYCE WOLKOMIR'S article on Vermont's Montpelier High School was inspirational. I was a home-economics teacher 40 years ago, and I had been having difficulty believing the mostly negative images of schools that are served up almost daily by the press.

My suite at the small Ohio high school consisted of a kitchen, living room and sewing lab, and it hummed with activity every afternoon after classes. We didn't have a guidance counselor or special education teacher back then, but students routinely dropped by and almost always found a teacher or a coach to whom they could talk.

The students sometimes sought advice on how to handle difficult situations, like the boy whose father came home drunk and slapped his mother around, or the girl whose boyfriend was pressuring her to "go

all the way" by saying, "If you really loved me you would."

I remember a lot of learning went on inside and outside our classrooms. This past June my grandson graduated from college, and I worried when he told me that he was looking forward to becoming a teacher. Now I am hoping he will find a way of becoming a contributing part of an environment like Montpelier High.

Virginia E. McCormick
Worthington, Ohio

KUDOS TO CHARLIE PHILLIPS, WHO IS the principal of Montpelier High School, and to the other staff members. The article clearly illustrates the caring and dedication of the school's employees, and that education is about much more than test scores and homework assignments.

James Montgomery
Arlington Heights, Illinois

THE WOLKOMIRS' ARTICLE "CHARTING One School's Challenging Course" was instructive and heartwarming. A positive article about public education is a rarity these days. In my opinion, thousands of similar schools could exist today if dedicated teachers and administrators had the full support of families and local communities.

James J. Gilbert
Brockton, Massachusetts

THE OBJECT AT HAND

THANK YOU FOR "SCIENCE MAKES A Better Lighthouse Lens" by Bruce Watson. As a member of the U.S. Coast Guard, which was formed in 1915 with the merger of the U.S. Lighthouse Service and the Revenue Marine, I invite your readers to visit our Fresnel lens display, located at the Reserve Training Center Yorktown in Yorktown, Virginia.

John Russell Canose, Jr.
Hudgins, Virginia

AS SOMEONE WHO WORKS IN OR-thoptics, an ancillary profession within the field of ophthalmology, I use Fresnel prisms extensively. They are helpful in treating childhood and adult strabismus (eye-muscle disorders) and double vision resulting from a variety of medical conditions and trauma.

Norma Pycock McClintic
Richmond, Virginia

THE LAST PAGE

I COULD CERTAINLY IDENTIFY WITH Louis Phillips' chagrin in his "What Good Is a List If You Can't Read It?" I, too, have been unable to decipher my own hieroglyphics. Recalling how we were taught to write in school, however, I'm glad that individuality almost always triumphs over the Palmer Method. People should be allowed to be somewhat autocratic in their handwriting.

Good penmanship, like passable deportment, is not much stressed nowadays. Still, a legible hand, like a straight spine, is never out of style.

William Dauenhauer
Wickliffe, Ohio

IN 1871, A CINCINNATI NEWSPAPERman misread a handwritten letter from Horace Greeley and "translated" the name of our local newspaper, the *Greeley Tribune*, as the "Gnarly Trombone." Today, Mike Peters writes a weekly column bearing that title.

Carolyn Carlisle
Kersey, Colorado

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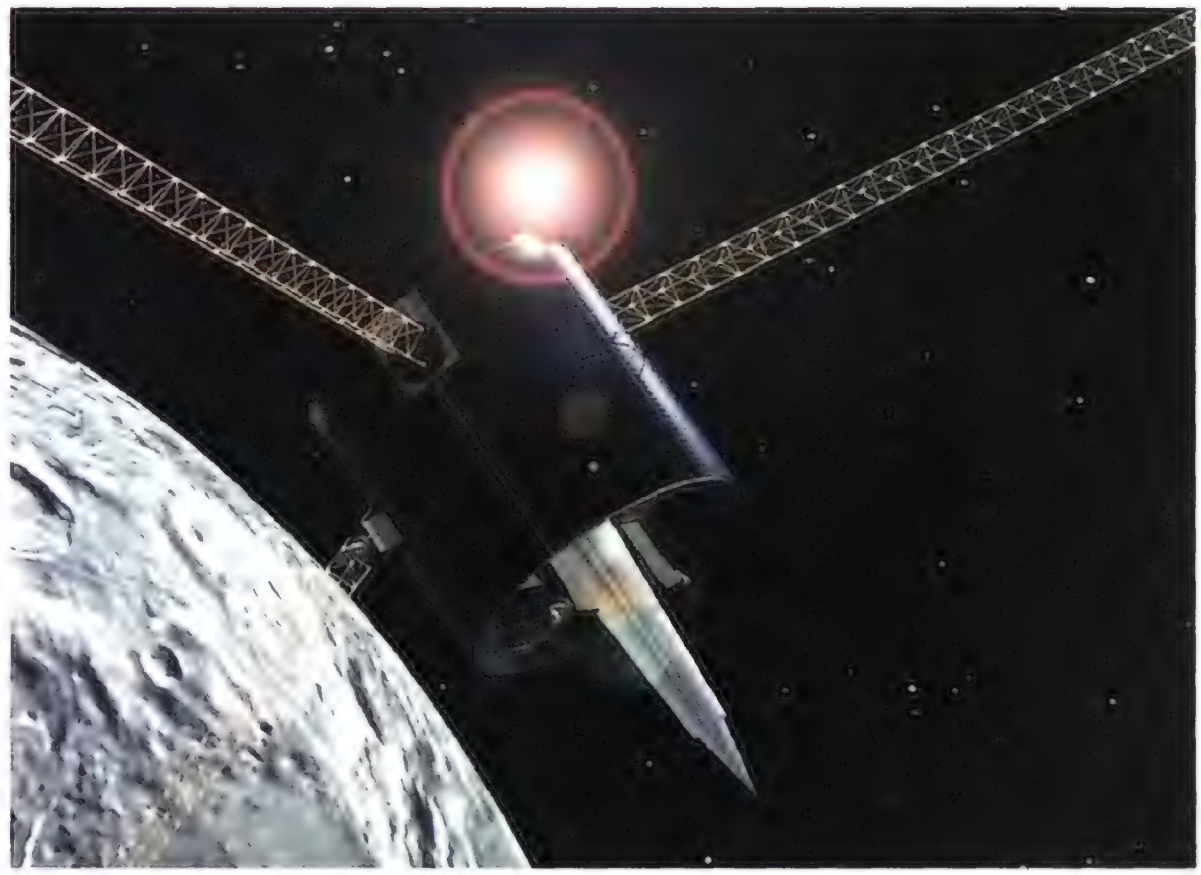
NASA Goes Ballistic

THE SPACE AGENCY CRASHED A SATELLITE ON THE MOON IN A SEARCH FOR WATER. IT WANTS TO "SHOOT" A COMET

BY JOHN P. WILEY, JR.



A small (354-pound) spacecraft named the *Lunar Prospector* orbits the moon in this artist's conception. Instruments are at the ends of the eight-foot booms.

NASA HAS NOT ONLY BEEN WORKing at making its spacecraft for exploring other worlds "faster-better-cheaper," it has been showing a new kind of creativity. Back in July, the agency had squeezed just about everything it could out of one of its new breed of stripped-down instrument platforms. The *Lunar Prospector* had spent 19 months in a polar orbit around the moon, gathering information on its gravitational and magnetic fields and surface composition (until now most measurements had been made near the moon's equator).

The 354-pound spacecraft was reaching the end of its useful life. Nearly all the fuel used for maintaining the craft's orbit was gone. Perhaps, too, the thought of simply leaving the *Prospector* to crash unremarked into the moon offended people's sense of neatness or completeness. In any event, a team of scientists led by David Goldstein, of the University of Texas, had an idea. Some astronomers—including Goldstein—had speculated that there just might be water ice mixed in the soil at the bottoms of craters at the moon's poles, places where sunlight never penetrates. The ice would never have melted, frozen forever by temperatures as low as -280 degrees F.

There was more. The *Lunar Prospector* had found evidence for the existence of hydrogen at the poles, a signal that itself could have meant water ice was present. How to find out? Goldstein's team proposed deliberately crashing the *Prospector* into a polar crater and analyzing the resulting impact debris. NASA agreed in a remarkably short time, a crater was picked and calculations made. The Hubble Space Telescope and major observatories on the ground, including the Keck in Hawaii and the McDonald in Texas, would watch for a plume of debris.

NASA last talked to the *Lunar Prospector* in the early morning hours of July 31, instructing the spacecraft to fire its thrusters in such a way that it would slam into the moon in the chosen crater. It was programmed to come in at a low angle over the rim on one side of the crater, traveling at 3,800 miles per hour, and crash at the base of the other side at 5:52 A.M., Eastern Daylight Time. They guessed the resulting cloud of debris could contain as much as five gallons of water. The *Prospector* disappeared behind the moon, as it had done more than 6,800 times before. It never reemerged, so NASA assumes it crashed as planned. No one saw a debris plume. Astronomers were still analyzing the data as this column was written. NASA had no way of knowing for sure where the *Prospector* crashed. Future explorers will finish the story.

It was a creative idea, though, trying to get one more bit of information out of a piece of dying hardware. (What a bit of information it would have been! If there is water on the moon, it will be infinitely easier for people to live there, should that time come.)

NASA has more ideas about slamming things into celestial objects to see what they're made of. A team of

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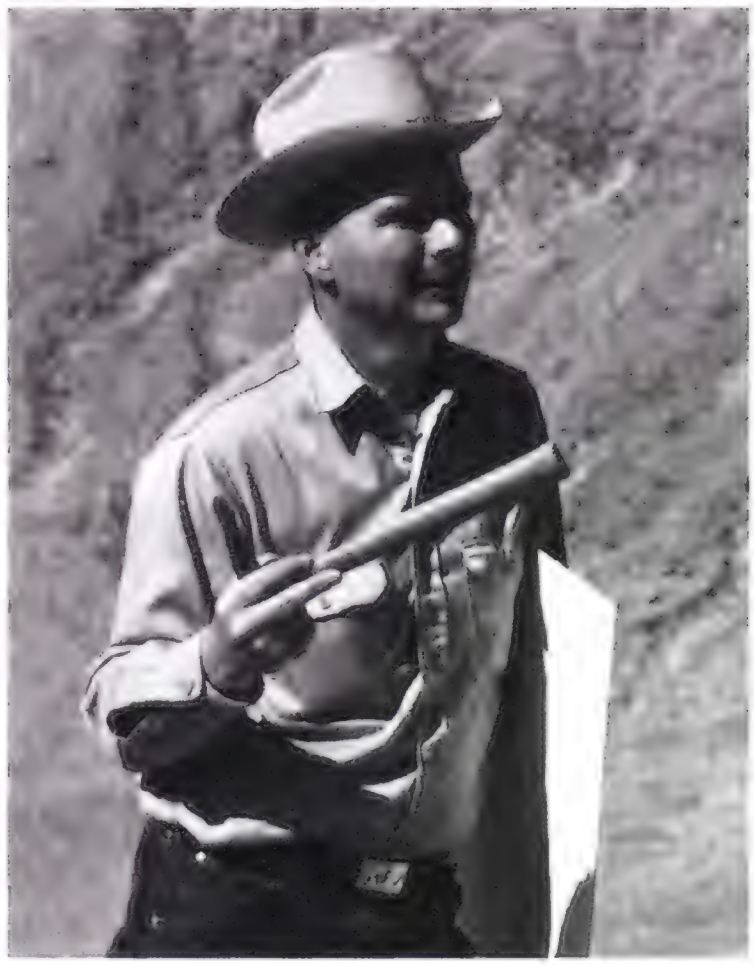
astronomers led by Michael A'Hearn at the University of Maryland proposes to "shoot" a comet. In the original plan, a spacecraft would rendezvous with Comet Tempel 1, believed to be about four miles across, in 2005. It would fire a 1,100-pound copper "impactor" at 22,400 miles per hour into the sunlit side of the comet, making a crater predicted to be larger across than a football field and 80 feet deep. The depth is critical. The scientists hope to find out not only what the surface is composed of but also what lies inside. (The bullet is made of copper so that when it vaporizes on impact, its presence will not confuse the results. Copper is not believed to be a constituent of this type of comet.)



In a photograph from the 1960s, Eugene Shoemaker walks inside Arizona's Meteor Crater.

Instruments aboard the spacecraft would record what happens at both visual and infrared wavelengths. A high-resolution camera would provide detailed images while one with medium resolution would offer a view of the whole crater and the comet nucleus. Once again space and earthbound telescopes would be watching. The comet would appear to momentarily brighten. (The whole scenario is iffy because at the end of July, the House Appropriations Committee cut the funds for Deep Impact and other space-science missions.)

If and when Deep Impact goes forward, the world's oldest science will have added a new department. You could call it high-impact astronomy, but an even better name might be experimental astronomy, something until now considered impossible.

Amid the violence of this new branch of astronomy, there has also occurred an entirely different kind of accomplishment. The *Lunar Prospector* did something far grander than study the moon for all those orbits and then use its last gasp to try to discover if there is water ice deep in polar craters. It carried the remains of a human being, in the form of ashes, which crashed with it on the moon, the first person to come to rest on a celestial body other than earth. Nowadays when a baseball player hits a home run, broadcasters sometimes say: "[Jones] has left the building." It's fun. But a man named Eugene Shoemaker really has left the planet.

The late Krafft A. Ehricke, a rocket designer, proposed that the most important events in the history of earth occurred when plants started to metabolize sunlight and when human beings began to metabolize information. The third, he wrote in 1985, would happen when human beings evaded the restrictions of living on a finite world by colonizing other worlds. This "extraterrestrial imperative" was crucial, he believed, and would happen in three steps: space industrialization, space urbanization and, finally, "extraterrestrialization," a mouthful meaning the inevitable divergence of people living on the moon, Mars and other planets and moons. In a symbolic way, in the form of one man's ashes, the migration has begun.

Shoemaker was a geologist who worked for the U.S. Geological Survey most of his life. He almost single-handedly founded the field of astrogeology, starting when scientists could not agree on whether most of the moon's craters resulted from impacts or volcanism. By showing conclusively that the 4,000-foot-wide crater near Winslow, Arizona, was formed by the impact of a meteorite, he catapulted forward the study of lunar craters. (Most are now believed to be the result of impacts.) The hole in the ground in Arizona is today known as Meteor Crater.

Shoemaker was interested in anything that could hit a planet or a moon. He surveyed the near-earth objects. In the process, he and his wife, Carolyn, discovered a number of comets, including the fragmented one named for them and David Levy that crashed into Jupiter in 1994 (SMITHSONIAN, June 1994 and January 1995). He died in 1997 in an automobile accident in Australia, where he was—what else?—studying impact craters.

He was unassuming, easygoing, smiling in conversation. At science meetings, he was infinitely patient with the press. From the first time he answered my questions at meetings of the American Association for the Advancement of Science in the 1960s to the last time at the Seattle meeting in 1997, he made me feel more at ease in my ignorance than almost any other scientist I've ever met. I hardly knew the man, but when he died, I felt I had lost a friend. I had. We all had.

More than anything else, he had wanted to go to the moon but a medical problem kept him out of the astronaut corps. Now he's there. For all those people all over the world who have ever wanted to trudge those gray sands and look back at the earth, but will never be astronauts, it's nice to know that one of us made it.

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Finding a Knight in Shining Armor

BY MICHAEL KERNAN

WELL, I DON'T KNOW QUITE how to describe this one. Maybe we could say it's a wedding story that got out of hand.

Here were Smithsonian computer whiz Bryan Kennedy and his fiancée, Linda Welzenbach, and they wanted to get married, but they hated the whole idea of the conventional ceremony with the garter and the bouquet toss and the Mendelssohn, so they decided to have a period wedding. And an original one, too.

Picking a period was simple. Just subtract, say, 600 years from that year, coming up with 1396. "She picked the time; I picked the place," said Bryan. "I said, how about Burgundy, in France."

The couple ordered their guests to come in costume and included research references in the invitations. They held the party not quite in France, but the next best thing, at Liriodendron, the great old mansion in Bel Air, Maryland, and not only did everybody come but nearly all the guests came in costume.

"And some of them were rented, but most were made from scratch," Linda recalls proudly.

Wait, that's not the story. Returning from their "plain old camping honeymoon," they turned into the driveway and heard sounds of sword fighting next door.

"We knew right away what it was, so we ran towards it," Bryan tells me.

The neighbors had only that day returned from England, where they had been training in the sport of live steel sword fighting. They talked it up so enthusiastically that the newlyweds bought swords of their own on the spot, ordering them from an armorer in England. (The weapons have no point and no edge, for safety reasons.)

Bryan Kennedy, left, and his wife, Linda, make medieval clothing and battle with swords for fun.

Sword fighting offered a switch from real life. Bryan, who now does computer-support work on contract to a number of Smithsonian offices, was at the time working for Smithsonian Institution Press. He had majored in English at Lynchburg College in Virginia on his way from his native New Jersey to Fredericksburg, Virginia, where the couple now lives. Linda, a geologist, is a collection manager for meteorites at the National Museum of Natural History.

"We joined a sword group for a while and fought in front of a bunch of people," Bryan says, "but then I got into the armor and the weapons and all of the accoutrements."

It was slow going, since relatively little hard information existed about details of 14th-century clothing. But the Internet helped. Bryan holds up a shoe he has made. It is a copy of a shoe in the Museum of London.

The soft, tan slipper is beautifully constructed with tunnel stitching, which doesn't make holes in the outer surface and theoretically keeps the water out.

"But on the first rainy day," he says, "you find out they're totally not waterproof. Apparently people wore little wooden clogs with them to stay up out of the mud."

And the helmet liner. This is a padded cap, with ties to go under the chin. It is stuffed with horsehair and is extremely handy on a cold day. Or when you are fighting.

"It keeps the helmet from ringing," Bryan remarks casually. Suddenly I realize how incredibly uncomfortable knights must have been in their armor. Even a light bash on the helmet would jangle your head like a cathedral bell.

These caps, says Bryan, were very common, "usually made of linen or wool—cotton was quite rare back

MEDFORD TAYLOR

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Bryan, in a black silk jupon, and Linda, in a velvet surcoat, don medieval-style wedding attire. Below: Bryan decorates a scabbard.

then and more expensive than silk.

"You wore tights under armor," Bryan explains, "and because the elastic qualities were kind of limited in those days, they had eyelets around the top so they could be laced to the eyelets in the doublet. To hold your drawers up," he adds.

Bryan is making a doublet right now, sewing it by hand the way he does everything else. He made some chain mail, which preceded plate armor. I had thought it came after because it would require more advanced ironworking, but it seems all you needed was a lot of wire. Winding the wire many times around a mandrel, he chiseled the wire loops off and pinched shut each little ring, hammered it flat, poked a hole through for a tiny rivet and then bunched the rings together in fours to make a mat.

"I cheated and used small key rings," he admits. "I farbed out on that." My ears went up. "To farb" means to fall out of character, he explains.

Bryan's mail jacket weighed some 30 pounds, and the thought of wearing mail gauntlets, plus tights and a hood, staggered him, to say the least. After that, plate armor was a breeze. You could do handstands in that steel carapace, he says, and the stories of knights bogging down in their armor are exaggerated.

For those who couldn't afford steel armor, there were 30-layer vests made from a strong, coarse cloth.

Bryan does not do much fighting these days. He made thigh protectors for himself and arm armor for Linda, but stopped short of the massive visored helm and pointy steel protectors for the feet.

"She's a much better fighter than I am. She's so fast and I have too much leg to protect. There's a shiny place on my leg where she hit it over and over. I never seem to get down there fast enough." He is nearly 6 feet tall; she is 5 feet 1.

Linda gets so excited about attending a Renaissance event that she is inspired to make the occasional gown or wimple. She uses a sewing machine, however. "My mother always made our Halloween costumes," she tells me, "so I guess that's in my blood."

The rules for English-style sword fighting in living history groups, pioneered by the Medieval Combat Society in England, limit the target zones to the top of the head and meaty parts of the arm and leg. No baseball swings, no thrusts. Fights aren't staged, but you tend to telegraph the blows, and the trick is to move fast enough to feint or counter before you're actually hit. In a show fight the combatant decides when to fall, "though if you take a realistically hard knock on the leg, you may have to fall anyway," Bryan points out.

In this fast-growing sport there are plenty of armorers advertising on the Web, and you can buy complete suits of armor from different centuries or countries. The Society for Creative Anachronism ("creative" suggests that clothing, fighting styles and equipment may not be authentic), based in Milpitas, California, has several "kingdoms" in the United States and abroad, some of which put on major wars every year. Imagine a field covered with thousands of combatants in homemade armor thwacking each other with rattan "swords," the society's weapon of choice.

As it turns out, Bryan and Linda may be adding colonial reenactments to their repertoire soon. Naturally, this era is popular in Fredericksburg, Virginia, where they recently moved. "We've been researching 18th-century clothing and making new friends," says Bryan. "And we can use cotton for that period."

MEDFORD TAYLOR (2)

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THE OBJECT AT HAND

Othmar Ammann's Glory

GENIUS, WILLPOWER AND THOUSANDS OF MILES OF STEEL WIRE WENT INTO THE GEORGE WASHINGTON BRIDGE

BY VALERIE JABLOW

In 1930, unfinished suspension cables of the George Washington Bridge sweep across the Hudson River toward New York City.

IT WAS CALLED THE MOST BEAUTIFUL BRIDGE IN THE world. At the time of its 1931 opening, it certainly was the longest single span. To honor the engineering feat it represented, a stamp with its picture was issued, and the bridge became the subject of music, even a children's book.

Yet, a section of suspension cable for the George Washington Bridge in the collections of the National Museum of American History (p. 38) can only hint at such glories. Three feet in diameter and ten feet long, the massive cylinder weighs an ungainly 34,000 pounds. From its ends protrude 26,474 individual steel wires, compacted under 400 tons of pressure. Before computers, this experimental section helped engineers model the effects of compression on the finished bridge's cables. Today, it represents an engineering marvel, whose creation spanned half a century of depressions, politics and the passions of two of America's greatest bridge designers.

No matter when it was built, the first bridge to span the Hudson River from New Jersey to New York City was destined for fame. After the Civil War, a single span was determined most suitable for the wide, heavily trafficked river just west of the fast-growing metropolis. But materials and engineering skill lagged far behind the dream.

Until 1888. Just five years after the completion of John Roebling's Brooklyn Bridge, then the world's longest suspension bridge, 38-year-old Austrian-born engineer Gustav Lindenthal put forth a plan for a suspension bridge across the Hudson. It was a grand concoction: six railroad tracks, more than a mile in total length. Its center span was to be nearly twice as long as that of Roebling's widely admired masterpiece.

Great feats of engineering require greater feats of imagination. For both, Lindenthal was well qualified. With little formal education and a physique to match the size of his dreams, he had taught himself English and the rudiments of engineering. Immigrating to America in 1874, he quickly prospered in his adopted land, whose engineers had more use for quick thinking and practical energy than college degrees.

By the turn of the century, Lindenthal was renowned

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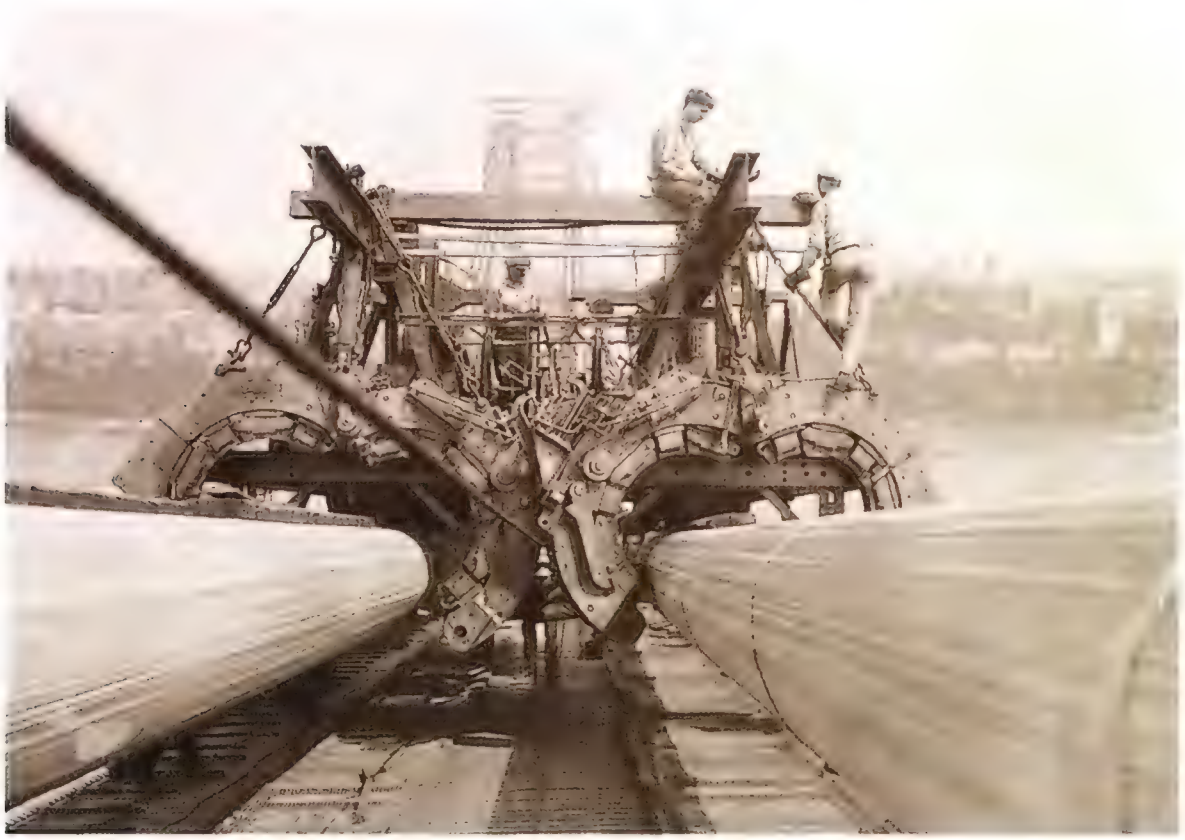
"I as well as others have been fighting against the unlimited ambition of a genius."

among his peers. His Seventh Street and Smithfield Street bridges in Pittsburgh were some of the most significant of their time. In 1902, Lindenthal became commissioner of bridges for New York City, a political appointment that gave him considerable power and prestige as an engineer and designer.

But his dream bridge still had not been built. Despite endorsement of Lindenthal's Hudson River bridge plan by the War Department, a rival bridge concern had sued to stop the project. By the time the case was settled, the depression of the early 1890s had dried up most of the funds. Replaced as commissioner after the 1903 city elections, Lindenthal found himself in the odd position of peddling new Hudson River bridge designs to myriad interested groups—with no agreement on location, cost or funding.



Wire bundles of the main cables were compressed by a moving machine called the "final squeezer" before suspender cables and traffic roadways were added.

In the meantime, the city grew. By 1912, Lindenthal was busy completing plans for a railroad bridge—the world's longest steel arch bridge, in fact—across the dangerous channel between Manhattan and Queens called Hell Gate. To help with the task, the august designer took on a 33-year-old assistant not long arrived from Switzerland.

Slight in stature, with a quiet demeanor that hid a steely core, Othmar Ammann seemed the opposite of the large, bluff, practically educated Lindenthal. Ammann's degree, unlike any that Lindenthal might occasionally claim, was from a Swiss institute of technology considered one of the most prestigious in the world. Ammann was impressed by his mentor, one of the world's preeminent bridge builders—and the favor was returned. "I estimate an engineer one-third by his character, one-third by his ability, and one-third by his experience," Ammann recalled Lindenthal saying before promoting him for outstanding work on the Hell Gate Bridge project.

Through all of this, Lindenthal's dream for a span over the Hudson continued. But what was grand in 1888 had, through decades of deferment, become fantastical. By 1923, Lindenthal's plan called for a bridge more than 200 feet wide, with two decks, one for 12 railroad tracks, the other for 20 vehicle lanes, including two for trolleys. Its massive concrete towers, at 825 feet high, would rise above even the ten-year-old Woolworth Building, then the world's tallest skyscraper. The price: at least a cool $200 million (nearly two billion in today's dollars). Ammann deferentially warned Lindenthal that such a costly project would never be realized. But the old master sharply rebuked his assistant for his "timidity and shortsightedness in not looking far enough ahead," as Ammann noted in his diary. "He stated that he was looking ahead for 1,000 years."

A thousand years or no, his professional relationship with Lindenthal quickly deteriorated. "In vain," wrote a frustrated Ammann to his mother later that year, "I as well as others have been fighting against the unlimited ambition of a genius that is obsessed with illusions of grandeur. He has the power in his hands and refuses to bring moderation into his gigantic plans. Instead, his illusions lead him to enlarge his plans more and more."

Working on his own, Ammann had developed another scheme. Quietly, he wrote to the governor of New Jersey with suggestions for a smaller, cheaper suspension bridge to be built across the Hudson at 179th Street. The newly formed Port of New York Authority, which enjoyed both states' cooperation and had a short time before rejected Lindenthal's expensive monstrosity, was immediately interested—to Lindenthal's understandable dismay. "Now it appears that A. has used his position of trust, the knowledge acquired in my service . . . to compete with me in plans for a bridge over the Hudson and to discredit my work on which I had employed him," Lindenthal wrote despairingly to the governor. "He does not seem to see that his action is unethical and dishonorable."

But new forces were at work. With construction under way for what would be known as the Holland Tunnel, it

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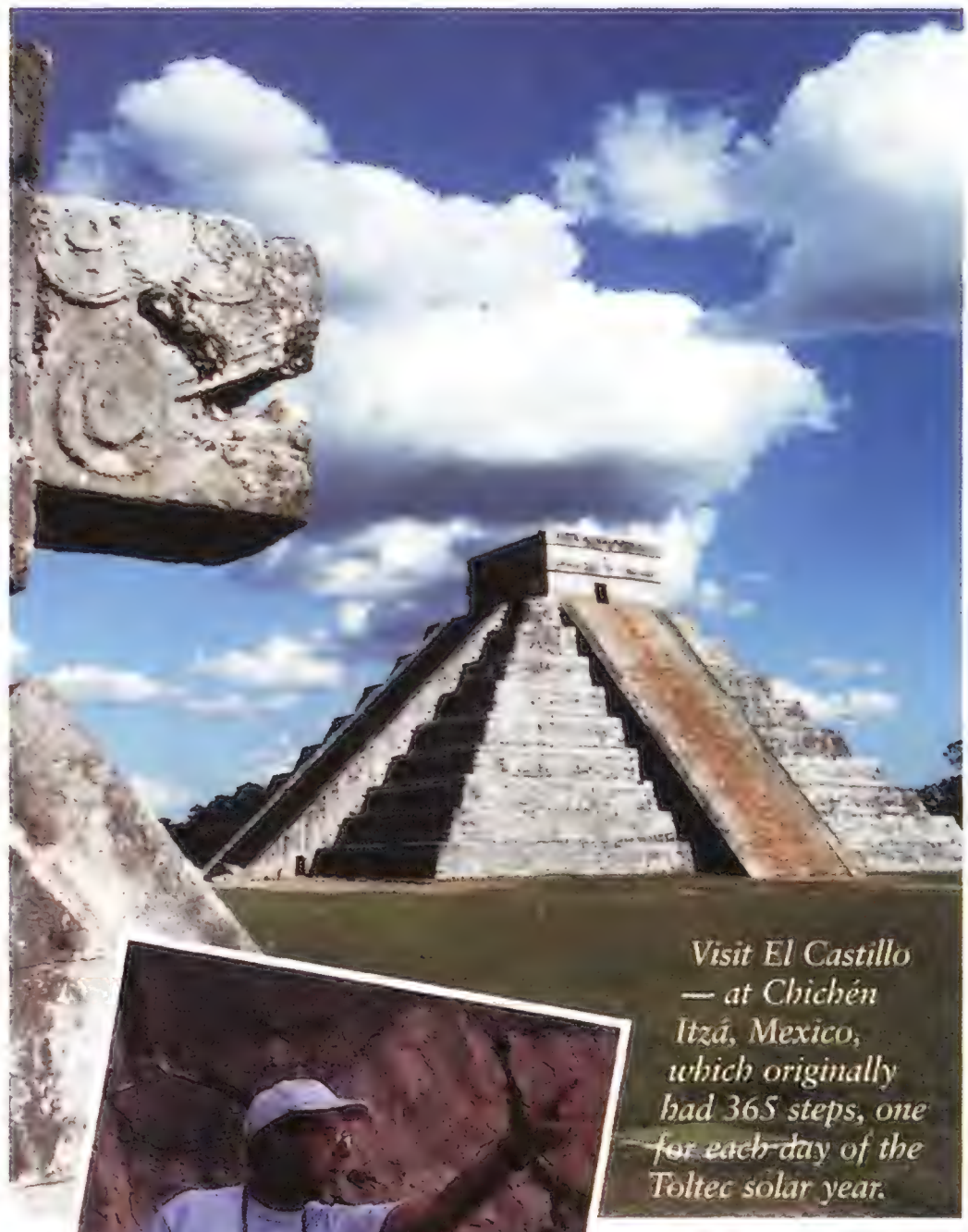

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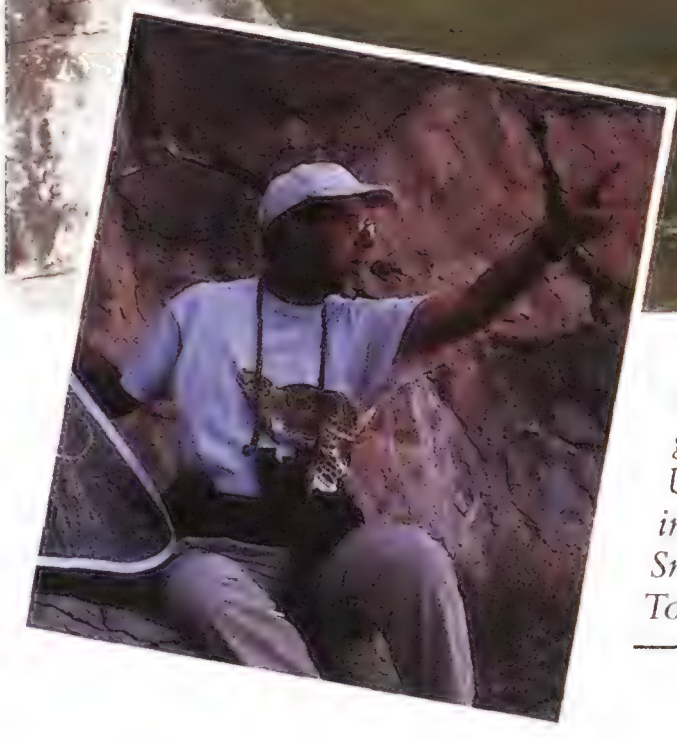
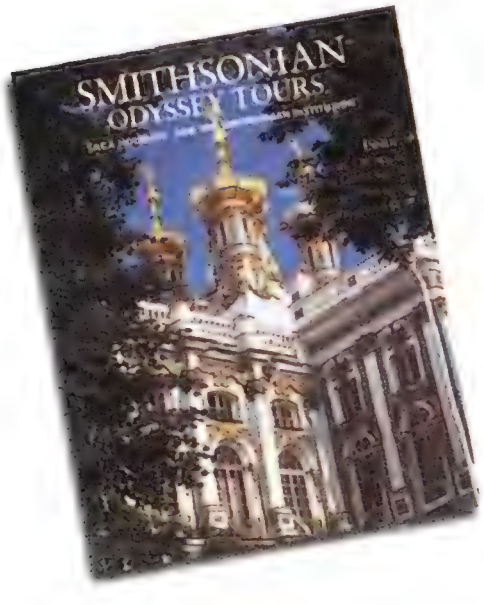


Inset: Kirt Kempter, who holds a Ph.D. in geology from the University of Texas in Austin, is a popular Smithsonian Odyssey Tours study leader.



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was assumed that connecting the metropolis to its burgeoning New Jersey suburbs by underwater routes would be cheaper than a bridge (a notion proved wrong well before the tunnel's 1927 completion). By that time, too, necessarily heavy (and expensive) railroad spans across the Hudson were steadily being eclipsed by less costly ones dedicated to a newly popular conveyance: the car. Already, in Philadelphia and Detroit, huge suspension bridges had been built for cars. The future was clear.

By 1925, Ammann was bridge engineer for the Port Authority, charged with designing not only the 179th Street bridge (then known as the Hudson River Bridge) but also a bridge between Staten Island and New Jersey—both mainly for cars. Construction of the Hudson bridge began in the fall of 1927, with more than 100,000 miles of cable wire strung across the river by John Roebling's company.

By any standard, the bridge was monumental. With a 3,500-foot main span—nearly twice that of the next largest suspension bridge, built just two years before—its slender deck was to arch gracefully more than 200 feet above the Hudson. Its twin 604-foot towers would stand nearly 50 feet taller than the Washington Monument. And each of its four cables could support more than 90,000 tons—ten times more than each Brooklyn Bridge cable.

For his design, Ammann owed as much to material advances since that 1883 wonder as he did to his own ingenuity. Improved steel ensured that when drawn to only 0.196 inch in diameter, each of the 26,474 wires that made one cable had a strength of at least 240,000 pounds per square inch—more than one and a half times that of the cable wires in the Brooklyn Bridge. And better machinery allowed the wires to be hung from the towers (a process called spinning) 16 times faster than in 1883. Engineers followed what they had learned from the behavior of their model, that ten-foot section of cable today in the Smithsonian's collections, to compress the wires together into their final, three-foot-diameter, cylindrical form.

In the relentless Great Depression, the bridge became a sort of savior in steel. Completed six months ahead of schedule, it cost less than the $60 million originally allocated. "Fulfilling a dream of three-quarters of a century," ran the ecstatic headline in the *New York Times*. On October 24, 1931, in front of thousands of spectators, New York governor (and soon to be President) Franklin Roosevelt and New Jersey governor Morgan Larson opened the bridge, newly named in honor of George Washington. In tribute to his mentor, Ammann drove with Gustav Lindenthal onto the bridge that the older man had spent his lifetime fruitlessly dreaming of.

Even more revolutionary than its length was the bridge's lack of a common design feature. Until the George Washington, modern suspension bridges were stiffened with steel trusses and beams to limit motion in traffic and wind (an important consideration when a bridge's length is large relative to its width and depth, like the George Washington's). But such stiffening often gave bridges less attractive, thicker decks—and added cost. Ammann reasoned that the sheer weight of his span, and its necessarily heavy cables, would by themselves provide sufficient stiffness.

The George Washington's resulting slender profile—both from the side as well as from above—fueled engineers' aesthetic sensibilities. Just six years later, the Golden Gate Bridge astounded the world with a narrower and yet even longer span. If such gracefully thin and relatively light bridges were sometimes disconcertingly flexible in a breeze (as drivers and engineers noted), they also were lovely to look at.

In 1940, however, the extremes of Ammann's innovation were dramatically demonstrated in the wind-driven collapse of the aptly nicknamed "Galloping Gertie," otherwise known as the Tacoma Narrows Bridge. After his investigation of that famous failure, which had been captured on film for the nation to see, Ammann wrote, "Its smaller weight and extreme narrowness has drastically revealed that this practice has gone too far."

By the early 1960s, when the George Washington's lower deck was added (as specified in the original plans), Ammann had all but eclipsed his mentor. Ammann's other 1931 creation, the Bayonne Bridge connecting Staten Island and New Jersey, was until 1977 the world's largest steel arch bridge—more than 600 feet longer than the previous record holder, Lindenthal's Hell Gate Bridge.

Months before his death in 1965, Ammann gazed through a telescope from his 32nd-floor Manhattan apartment. In his viewfinder was a brand-new sight some 12 miles away: his Verrazano-Narrows suspension bridge. As if in tribute to the engineering prowess that made Ammann's George Washington Bridge great, this equally slender, graceful span would not be surpassed in length for another 17 years.

This section of highly compacted wires was used to test the properties of the bridge's massive cables.

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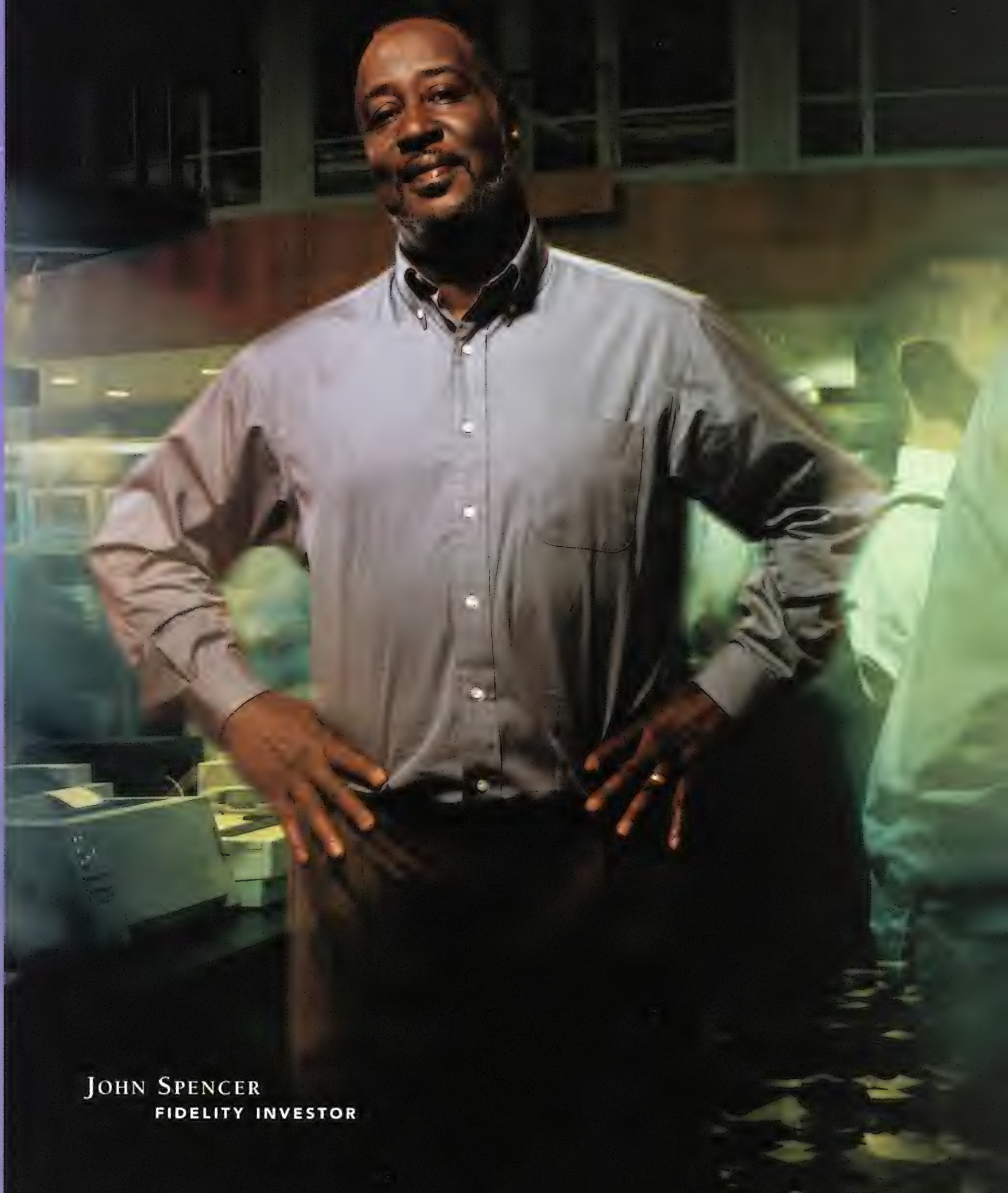

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"EVERY AGE AND EVERY people have had their own form of beauty," wrote Charles Baudelaire in 1846. What might beauty mean in late 20th-century art? *Gold Marilyn*, 1962 (above), one of Andy Warhol's celebrity portraits, provides an example. In it, the actress is transformed from a Hollywood idol into a Renaissance saint, in a tondo treatment once reserved mainly for the Madonna. With its gold background, the portrait is reminiscent of Byzantine religious icons. It is a "fascinating fusion of sexuality and religion, of art history and pop culture," says the catalogue of the exhibition "Regarding Beauty: A View of the Late 20th Century." The show, curated by Neal Benezra and Olga M. Viso, opens October 7 in celebration of the Hirshhorn Museum and Sculpture Garden's 25th anniversary. Its array of 90 works examines how modern artists confront beauty in their work, addresses the value of beauty, and debates what it might mean in the century to come. —*Beth Py-Lieberman*

SMITHSONIAN HIGHLIGHTS

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SMITHSONIAN HIGHLIGHTS

Ancient Treasures from Mesopotamia

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Between 1922 and 1934, a remarkable archaeological find was made on the western bank of the Euphrates River in what is now southern Iraq. It was a cache of undisturbed artifacts and human remains from the ancient Sumerian city-state of Ur from nearly 5,000 years ago. The most stunning discovery was a group of 16 royal tombs made of elaborate mud-brick or stone construction. They contained the remains of dozens of men and women who had been sacrificed and buried with the main tomb occupant, a person of high rank or royalty. Amid the human remains were grave goods, rich burial gifts of unparalleled beauty and craftsmanship. "Treasures from the Royal Tombs of Ur," a traveling exhibition, opens October 17 and will be on view through January 17, 2000. Among the 150 objects are jewelry, musical instruments, tools and weapons in precious metals, and a silver lion head (below). Its slanted, deeply inset eyes, made of lapis and shell, create an intensity of expression rarely achieved in Mesopotamian art.

A silver lion head from ancient Mesopotamia will be on view at the Sackler Gallery.

Observatory Nights

HARVARD-SMITHSONIAN CENTER FOR ASTROPHYSICS

Join CfA scientists on the third Thursday of every month for free lectures and rooftop telescope activities in Cambridge, Massachusetts. On October 21 at 8 P.M., Smithsonian astrophysicist Harvey Tananbaum will give a talk, "Early Results from Chandra: NASA's 'Great' New X-ray Observatory," in the Phillips Auditorium, 60 Garden Street, Cambridge, Massachusetts.

SMITHSONIAN Website

WWW.SMITHSONIANMAG.SI.EDU

Visit our homepage for photographs from the Hirshhorn Museum and Sculpture Garden's show "Regarding Beauty" (and see p. 42). Click on "Events" for information on exhibitions and publications, and to learn about other Smithsonian activities.

Exhibitions and Events

NATIONAL MUSEUM OF AFRICAN ART

Wrapped in Pride: Ghanaian Kente and African American Identity (through January 2, 2000) Cosponsored by the Anacostia Museum and the Center for African American History and Culture, the exhibition examines the history, weaving technology and uses of kente cloth. The exhibition continues in the Arts and Industries Building.
Hats Off! A Salute to African Headwear (through December 26) Drawing from its collection, the museum pays tribute to the creative genius of the makers of African headwear and the prestige of the wearers.

ARTS AND INDUSTRIES BUILDING

From Bento to Mixed Plate: Americans of Japanese Ancestry in Multicultural Hawaii (through November 30) Personal artifacts, photographs and a small 19th-century locomotive from a Hawaiian sugar plantation.
Revue Noire: Africa by Africans (through January 2, 2000) A celebration of a century of African photography, including studio portraiture, official press photography and works by contemporary artists.

DISCOVERY THEATER

Performances for youngsters. Call 202-357-1500 (voice or TTY) weekdays, 8 A.M.-4 P.M. "Duet Cantare: A Musical Journey through Latin America," October 4-15. "Shizumi and the Art of Japan," October 25-November 5.

NATIONAL MUSEUM OF AMERICAN ART

Edward Hopper: The Watercolors (October 22-January 3, 2000) Hopper's first critical and financial success came with these carefree pictures of beach houses, fishing boats, lighthouses and New England landscapes.

RENWICK GALLERY (NMAA)

Glass! Glorious Glass! (January 30, 2000) The museum's studio glass collection of 56 works by more than 40 artists reveals every facet of this medium and includes Susie Krasnican's clever *Dress for Success* (p. 47), a silhouette of a dress, cut from glass. The work is painted with enamels and etched with phrases such as "It is better to ask some of the questions than to know all the answers" and "Experience is a good teacher, but she sends terrific bills."

NATIONAL MUSEUM OF AMERICAN HISTORY

Photographing History: Fred J. Maroon and the Nixon Years, 1970-1974 (through December 5) Many of these intimate and dramatic images by the Washington freelance photographer have never been exhibited before.

UPENN MUSEUM OF ARCHAEOLOGY AND ANTHROPOLOGY; P 42 PRIVATE COLECTION

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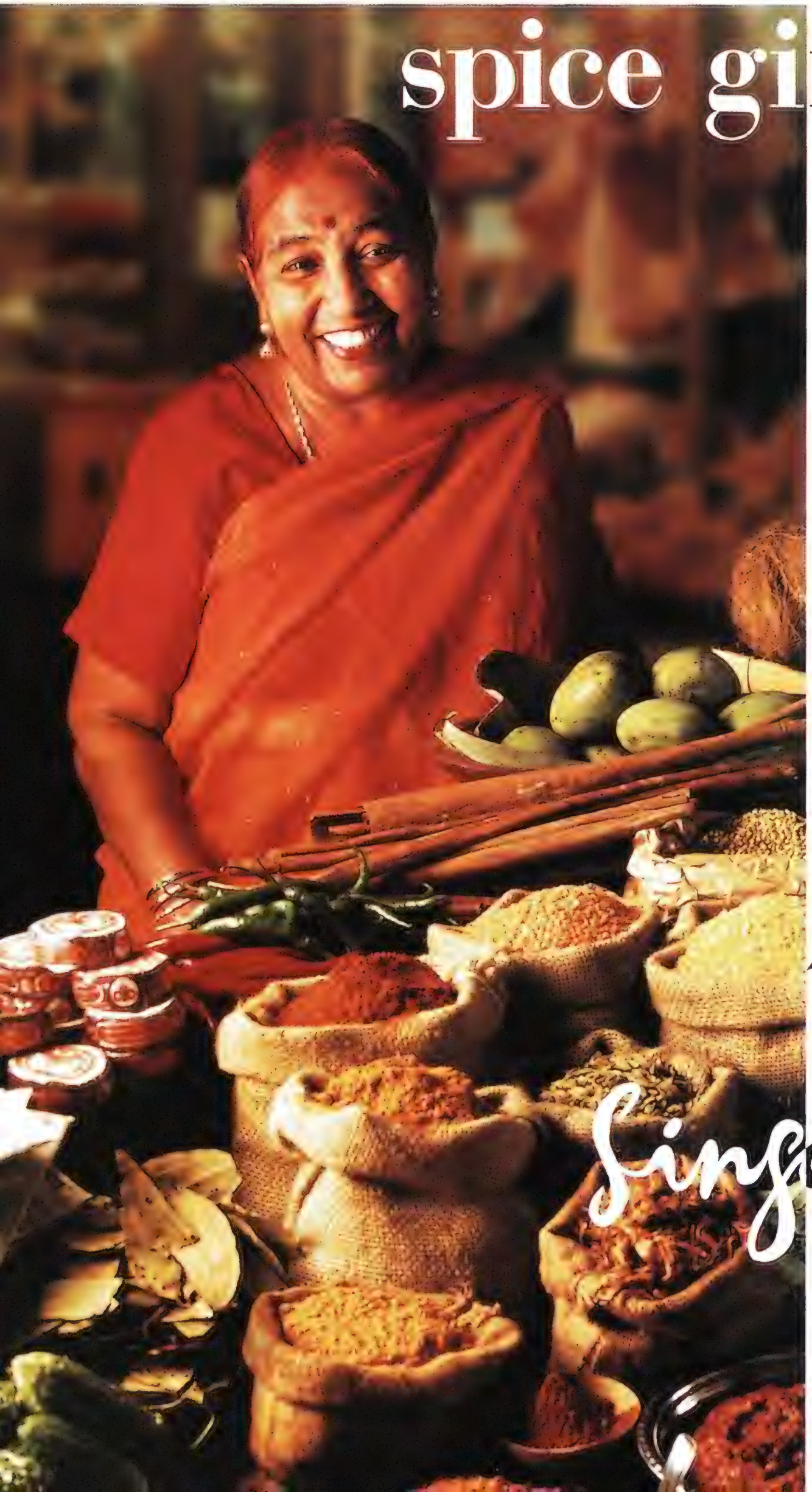

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Susie Krasnican's *Dress for Success* can be seen at the Renwick Gallery.

Preserving the Star-Spangled Banner: The Flag that Inspired the National Anthem Visitors are invited to observe the conservation process.

NATIONAL MUSEUM OF NATURAL HISTORY

Ainu: Spirit of a Northern People (through January 2, 2000) An unprecedented, in-depth look at the 10,000-year-old culture of the Ainu, the indigenous people of northern Japan.

NATIONAL AIR AND SPACE MUSEUM

Breitling Orbiter 3 The gondola of the first balloon to travel nonstop around the world, in 19 days 21 hours 47 minutes, is on permanent display.

HIRSHHORN MUSEUM & SCULPTURE GARDEN

Directions—Sam Taylor-Wood (through October 17) A London video artist in her first U.S. museum show.
The Hirshhorn Collection at 25 Works from the museum's permanent collections, from Thomas Eakins to today's emerging artists, are brought together on two floors in celebration of the museum's 25th anniversary.

NATIONAL POSTAL MUSEUM

Posted Aboard R.M.S. Titanic (through June 12, 2000) Artifacts recovered at sea nearly 90 years ago memorialize the five sea post clerks who lost their lives when the great ship sank.
Mayhem By Mail (through April 2000) Explores three categories of crime investigated by U.S. Postal Inspectors.

ARTHUR M. SACKLER GALLERY

Yoshida Hiroshi: Japanese Prints of India & Southeast Asia (through October 17) More than 30 prints by the Japanese print artist based on his travels in India and Southeast Asia.

FREER GALLERY OF ART

A Breath of Spring (through January 9, 2000) Exhibition of a 14th-century Chinese handscroll painting, recognized as one of the greatest examples of pure-ink painting.
Arts of the Islamic World Paintings, calligraphy, glass and ceramics.
Shades of Green and Blue: Chinese Celadon Ceramics Forty-four works illustrate the development of the glaze.
Masterpieces of Chinese Painting (through January 30, 2000) Calligraphy, handscrolls, hanging scrolls, murals and screen paintings—some of the great works for which the Freer Gallery is known worldwide.

ANACOSTIA MUSEUM

Through These Eyes: The Photography of P. H. Polk (October 1-December 1, 1999) Works by Polk, the official photographer of Tuskegee University for nearly 50 years, spotlight Southern life in its many moods.

NATIONAL PORTRAIT GALLERY

Picturing Hemingway: A Writer in His Time (through January 2, 2000) An exhibition to mark the 100th anniversary of the author's birth.
A Durable Memento: Portraits of Augustus Washington, African American Daguerreotypist (through January 2, 2000) The first major showing of Washington's work.

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Instruments of Change: Jim Schoppert Retrospective 1947-1992 (October 3-February 6, 2000) Works from the contemporary Tlingit artist from Alaska.

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EXHIBITION CATALOGUES

Catalogues for most exhibitions may be purchased in the respective museum shops. Publications currently available include: *Picturing Hemingway* ($35 cloth) ◆ *The Nixon Years, 1969-1974: White House to Watergate* ($29.95 cloth) ◆ *Ainu: Spirit of a Northern People* ($39.95 paper) ◆ *Wrapped in Pride: Ghanaian Kente and African American Identity* ($80 cloth, $45 paper)
To order, send check or money order to Smithsonian Museum Shops, 8308 Cinder Bed Road, Lorton, Virginia 22079. Include 15 percent of purchase price for postage and handling (minimum charge, $4.50).

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IMAX Takes Us Undersea IN THE Galápagos

FILMMAKERS SHOOTING A NEW 3-D IMAX MOVIE DISCOVER TRAGEDY AND TECHNICAL CHALLENGES AMID MOMENTS OF BREATHTAKING BEAUTY

BY JOHN F. ROSS

WHEN FILMMAKING IN A REMOTE SETTING, EVEN THE routine isn't routine. Take one: a moonless July night on the surface of the Pacific Ocean 100 yards off the coast of Marchena in Ecuador's Galápagos Islands. The underwater crew of the three-dimensional IMAX film *Galapagos* prepares to film the *Johnson-Sea-Link II* submersible with scientists inside collecting fish samples. In preparation for the night dive, the bouncing swim step of the 70-foot dive boat *Daphne* is bristling with activity. Al Giddings, the cameraman whose credits include *Titanic* and *The Abyss*, gruffly warns the collection of divers to "go easy on the gas and put on a lot of rubber," diver shorthand for conserving air and wearing a thick wet suit against the cold. Although we're on the Equator, strong ocean currents from the southeast bring in cold, nutrient-rich water, a large reason why the Galápagos has such lush marine life. Two divers

Moments before plunging 3,000 feet, scientists inside the *Johnson-Sea-Link II* adjust the lasers that guide their remote video camera.

wrestle 1,200-watt mercury halide lights over the side, each light connected by cable to a generator aboard the *Daphne*. Giddings splashes into the dark Pacific and submerges, taking the camera with him.

The swim step is crowded with yellow scuba bottles, wet suits and a tangle of regulators. Fish wrangler John McCosker hustles one of the "performers" of the upcoming film sequence, a venomous scorpion fish, into a mesh dive bag. Caught earlier in the day, it's a large red puddle of a fish with gaping jaws and venomous spines thrusting menacingly from its dorsal fin. One of those spines pierces the thumb of the California Academy of Sciences ichthyologist, sucking the breath right out of his lanky body. He neutralizes the toxin by sticking his thumb into a mug of hot coffee. In a few minutes the pain lessens and he jumps into the water, the fish finally secure in the bag.

Fifty feet underneath the *Daphne* sits the *JSL II*; its pilot and a scientist are packed inside behind a five-inch-thick acrylic sphere just 68 inches wide. This same research vessel, replete with mechanical arm and suction tube (with which the scorpion fish will be "captured"), recovered pieces of the space shuttle *Challenger* in the waters off Florida. Six divers array themselves around the sub, positioning lights and the large camera. Attracted to the lights, hundreds of harmless but pesky bullseye puffers swim around, too, staring into our masks with seemingly astonished eyes. The setup takes long minutes, a slow-motion ballet. Just as the free-swimming camera crew gets ready to start filming, Giddings' second-in-command, Randy Wimberg, notices that a monstrous object, the size of a jet ski, is bearing steadily down upon them.

Scientist Carole Baldwin helps cinematographer Al Giddings, left, steer the 3-D IMAX camera, which peers from its underwater housing.

Moments before this apparition plows into the $1.3 million camera, Wimberg realizes that it's a Danforth, the sizable stern anchor of the *Daphne* that's pulled its bite. The swinging motion of the boat is whipping the anchor along the sea bottom, like a plow bouncing behind a galloping horse. Wimberg drops his hold on the camera and shoves the anchor away. The rogue anchor sweeps out of the range of the lights; order is temporarily restored. Moments later, the anchor suddenly reappears, this time cruising right toward the submersible. Inside, the occupants, sub operator Don Liberatore and Smithsonian scientist Carole Baldwin, the star of the film, look on with horror. Another diver jumps on the anchor, which now sports a light cable wrapped about it. The diver manages to divert the anchor, riding it like a pair of water skis. The Danforth misses the sub with feet to spare. The shoot is canceled for the rest of the night. The divers climb out of their wet suits in silence. "All I saw down there," says Giddings angrily, "was mud, eyeballs and elbows."

I've watched and enjoyed a fair number of natural history documentaries in my day, so I jumped at the invita-

RANDY WIMBERG/AL GIDDINGS IMAGES

Like a plow behind a galloping horse, the rogue anchor tears right toward the sub.

tion to join the 40-odd-member crew for a month during the shooting of a new film about the Galápagos. Coproduced by the Smithsonian Institution and Imax Limited of Toronto, the film premieres this month at the National Museum of Natural History's Johnson IMAX Theater. The movie follows Smithsonian ichthyologist Carole Baldwin on her first visit to the Galápagos, the cluster of volcanic islands that straddles the Equator 600 miles off the Ecuadorean mainland, made world famous by the brief visit of an English naturalist more than 150 years ago. The archipelago's remoteness, its unique plants and animals, and its geological newness, in addition to the remarkable docility of its animal inhabitants, helped spark Charles Darwin's revolutionary theory that life evolved through the mechanism of natural selection. Most biologists dream of visiting the Galápagos; Baldwin is no exception.

The expedition I join is not an ordinary documentary film shoot, because it is being filmed in a new format. Only about a dozen 3-D IMAX films have been shot, and the technology is new, cumbersome and challenging. Even so, I have no idea just how difficult the shoot will prove to be. The production faces one problem after another. Just three weeks earlier, two film-crew members, Bill Raisner and Noel Archambault, had died in a plane accident. The empty bunks and painful memories of the five-day search and rescue hang over the crew tangibly, like the feeling one has upon waking up disoriented from a nightmare.

The current generation of natural history filmmakers is not satisfied with just getting the shot. These days the pressure is on to do it with high cinematographic standards for a sophisticated audience that wants increasingly greater visual thrills. Such endeavors, I learn firsthand, carry high risks.

Three-dimensional IMAX represents the latest leap in large-format filmmaking, technology that began in 1970 with the 2-D IMAX now featured in science museums and movie theaters around the world. With its large frame—a single frame is closer in size to a playing card than to the postage-stamp-size frame of a Hollywood film—an IMAX film can be enlarged by projectors until it covers a screen as much as 100 feet in height. The film is expensive, the camera is huge and special theaters must be built to accommodate the large screens. Anyone who's seen *Everest* or *To Fly* at the Langley IMAX Theater at the National Air and Space Museum knows that an IMAX film creates an unforgettable virtual-reality experience that verges on the overwhelming.

The new 3-D IMAX format takes a breathtaking leap beyond the traditional 2-D IMAX. The audience puts on polarized goggles that integrate their visual experience into three dimensions. Forget comparisons with the red-and-green-colored glasses of the 1950s; 3-D IMAX pushes at the borders of actually being there. In some ways, it can prove more intense than reality because the film strings together a series of remarkably vivid moments.

Shooting with a regular IMAX camera is like leading a buffalo with reins; working with a 3-D IMAX camera is like walking an elephant through safety cones set up for testing a motorcyclist's road skills. Each of the two existing 3-D cameras—we have both—resembles a 19th-century train safe in size and shape. Because the camera mimics the 3-D process through which our own eyes work, its

Baldwin, a Smithsonian icthyologist, examines the ethereal purple folds of a sea cucumber, collected only hours earlier from the cold, lightless depths below 2,000 feet.

Clockwise from right: A colony of marine iguanas sunbathes on Fernandina Island; one fearless land iguana poses for the 3-D IMAX crew on Plaza Island; a red-footed booby on Genovesa Island; the ubiquitous Sally lightfoot crab.

two lenses are separated by the distance between an average person's eyes, giving it the visage of a startled, unblinking robot. Inside are microprocessors that coordinate the advancement of two film loops and handle the lens controls. The two loops synchronously advance at a rate of 24 frames per second, while a vacuum system works to hold the film stock in place as it is exposed.

Preparing the camera for underwater shooting is akin to dressing a medieval knight. It involves encasing it in an inch-thick, cast-aluminum housing with an acrylic port through which both lenses peer. After the film magazines are loaded, the film path cleaned of dirt and salt residue, the film threaded, and myriad other details attended to, the massive ends of the metal casement must be wrestled together and then bolted. What takes a matter of minutes with a video camera can take as much as an hour with the underwater 3-D IMAX camera. Thus armored, the camera has the height of an overturned refrigerator and is about three-quarters its length. Originally, the producers intend to launch the 1,200-pound unit from a 30-foot vessel with a special clamshell bow that can be opened so that the camera can slide out into the water. The designer has not counted on the effects of the quirky global weather phenomenon known as El Niño. Waves kick up and the ship is caught in a constant chop. The cleverly designed boat, outfitted with two expensive diesel engines, nearly sinks and must be scrapped. The producers must come up with a new plan in short order.

They charter the 70-foot *Daphne*, and the film crew bolts the large candy-cane form of a davit to her stern. This, too, proves inadequate, the davit bending under the weight of the armored camera. Finally, welded and reinforced, with

BOTTOM LEFT DAVID CLARK IMAX CORPORATION (2). KIMBERLY WRIGHT/IMAX CORPORATION (2)

vice grips cinching bicycle chains around key points, the davit system works—just barely.

When all is ready for launch, the Ecuadorean crew of the *Daphne* and the film crew all shout "*hala, hala, hala,*" or "pull," in Spanish, and a dozen men reach for the ropes and tug on various points of the davit so that the immense camera swings out over the water. An electric winch slowly drops the camera into the waves. Divers in the water unhook the cable while trying to avoid getting pinned between the bobbing stern and the camera. What worked on paper becomes a different matter in the field.

Getting the camera into the water proves only part of the challenge. Physicists at IMAX headquarters in Toronto calculated the buoyancy of the camera and its housing, and their findings were later tested with extensive pool work. To offset the buoyancy of the air trapped inside the metal armor, the camera is weighted inside and out. Bolts are positioned on the outside so that additional weights can be attached. On one of its first times in the water, the camera sinks like a boulder, rocketing toward the seafloor hundreds of feet below. Giddings and Wimberg pull the camera to a stop at 130 feet.

Even after a month of practice, Giddings finds the camera unwieldy and difficult to control. He takes to referring to it as "the damned refrigerator." Embracing the camera in a wide bear hug and wrestling it into position, Giddings holds his breath for long moments, often muscling the camera back with his arms for a view up toward the surface to silhouette a passing hammerhead shark or flock of rays. Holding one's breath is not just a macho feat in the world of underwater cinematography. Air bubbles scare away underwater wildlife. And the camera's 30-millimeter fish-eye lenses easily capture the bothersome exhaust bubbles from the regulator of a cameraman who's not being careful enough. A 1,000-foot roll of film is shot in just three minutes; with two rolls needed at $1,000 a roll, Giddings must make every single second count.

Despite the technical challenges, moments of sheer natural wonder abound. In one scene, Carole Baldwin scuba dives around a pile of rocks and discovers a half-dozen spotted moray eels. It's rare to see moray eels come outside their lairs during the day, but it occurs often in the Galápagos. Three to four feet in length and thicker than a man's forearm, these morays sport heads the size of duckpin bowling balls, but with powerful jaws and mouths filled with teeth. "Each time I swim into the scene," Baldwin reports with a shudder, "the eels leave the rocks and come toward my face!" They flail about her head and neck as if in some otherworldly dance. "At first I was sure that someone had sabotaged my gear with bait," she says, "but they were probably just curious. Even so, the first time, I practically sucked down half my air supply in one gulp."

While the underwater team struggles along, a "topside" crew encounters its own set of difficulties filming on land.

Parque Nacionale Galápagos guide Mathias Espinosa and Carole Baldwin rappel into Santa Cruz Island's Cueva de Kubler, a lava tube through which molten lava poured about 3.5 million years ago.

Though it doesn't need the metal casing that the underwater camera requires, their camera still weighs about 250 pounds with lenses and film magazines. Four detachable metal rods turn the camera into a palanquin-like "Cleopatra rig," so that two of the film crew can distribute the weight onto their shoulders when carrying the camera from one location to another. On a walk of just over a mile to a spectacular blowhole on the east side of Española Island, the film crew looks like some exotic African safari, a long line of grips, gaffers, producers and technicians slowly following the camera. The weight of the equipment, the heat of the equatorial sun and the uneven footing bows all heads and mutes most voices.

In packs, litters and aluminum suitcases are film stock, lenses, "baby legs" (small squat tripods) and other gear with curious names, such as "snoots," bottomless potlike contraptions that focus light, and "spuds," clamping devices for lights. Carrying several sandbags in my arms and a 60-pound backpack filled with sound recording equipment gives me a different experience of the Galápagos than the typical tourist gets. As I walk carefully, I remember the comment made by the first visitor to the Galápagos, Tomás de Berlanga, the third Bishop of Panama. In 1535, his ship blew off course. Of the islands he commented, "It looked as though God had caused it to rain stones."

By trip's end, most of the topside crew bear the telltale abrasions and cuts on their ankles and calves from the rough-edged volcanic rocks. Late in the trip, thousands of biting flies, fed on iguanas killed by severe weather changes caused by El Niño, descended on the film crew, whose hands were too full to swat them away.

While the land is not conducive to easy camera setups, the animals are nothing but obliging. In a comic scene, repeated regularly, six strapping crew members groan and grunt as they swing the fully loaded camera into position, often only a half-dozen feet from a sea lion, a nest of blue-footed boobies or the regal gaze of an immense land iguana. The animals look on with something like amused indifference. On Genovesa Island, the camera crew decamps in front of a male frigate bird in full display. A large black bird with long, thin, zigzag wings for riding the wind currents, the male frigate bird inflates a large scarlet sac on its throat in a bid to attract a female. Sitting on their nests, the males unfurl their wings and dance about, their beaks upthrust because of the inflated sac. Females inspect the males from above, landing occasionally for a closer look. We find a male eligible for filming, but by the time the camera is in position with film loaded, lens selected and information programmed in, 45 minutes have passed and the bird has lost interest in the commotion in the skies above his head. He settles down, perhaps tired for the moment of playing the avian Don Juan. With upwards of 20 people peering at the bird from the vantage of only several feet, the expectation of a terrific shot founders, then nearly dies, even though females continue to swoop above our heads and nearby males keep up their antic dancing.

With a flash of inspiration, ichthyologist John McCosker grabs a red baseball cap off the head of a startled gaffer and starts waving it wildly above his head. Our quiet frigate bird believes it to be the blood-red throat of a competitive male and immediately resumes his mating dance. The camera whirs to life and the moment is captured. The camera crew does its own dance of joy.

With all the logistics of the shooting topside and underwater, it's surprising that much science gets done at all. The film crew supposedly is documenting the work of McCosker, Carole Baldwin and Smithsonian marine biologist Dave Pawson. Most of the work occurs in the *John-*

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KIMBERLY WRIGHT/IMAX CORPORATION

son-Sea-Link II submersible. In Darwin's time, the extent of his viewing underwater was limited to gazing through glass-bottomed buckets on the surface. In the early 20th-century, adventurer William Beebe dove 20 feet in a cumbersome copper helmet and hose contraption, resupplied with air by means of an automobile pump. "No sunset, no mist on distant mountains that I have seen," he wrote rapturously, "could compare with this." Within the past 50 years, scuba divers have plumbed Galápagos waters down to a couple hundred feet. Only recently, however, have small submersibles, such as the *JSL II*, enabled scientists to penetrate the ocean below 200 feet. Had the young Darwin been present on this trip, I've no doubt that he would have clamored to ride the submersible into these uncharted depths.

I take two trips in the sub's claustrophobic rear chamber, an aluminum-alloy, lozenge-shaped cylinder. One of the two sub operators lies in it with me, our shoulders, heads and legs crammed up against machinery, fans circulating fresh air, and bags of chemicals that are used to "scrub" dangerous carbon dioxide out of the air that we exhale from our lungs. The 3½-hour ride is akin to sneaking off to an entrancing film on a sunny afternoon, the film taking one out of body and time.

I'm connected by headset and microphone to Dave Pawson, who sits up front with the sub pilot in the clear plastic sphere. As we descend, his pleasant voice with its slight New Zealand accent is my umbilical cord to reality. Below 700 feet, there is no visible light; at more than 1,500 feet, the darkness presses relentlessly until it seems as though it has climbed back behind my eyeballs, a complete darkness that I imagine must resemble that found in deep space or on the dark side of the moon.

When we gently touch the bottom at 1,545 feet, our lights reveal an alien topography, comparable to a dune-rich desert viewed from the air. Immediately, the electric motors begin to whir, moving the sub forward. Then a telltale whine announces that the sub pilot, Don Liberatore, has begun to chase the first specimen with the mechanical arm. The fishes, crustaceans, coral and other creatures that we collect are deposited in a dozen clear plastic pails arranged underneath the sub.

As I stare out my porthole, Pawson wakes me from a reverie with an insistent "Do you see that? Do you see it?" It's a *Pelagothuria*, a swimming sea cucumber. It resembles

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This creature is otherworldly, embodying a state of grace that I've rarely seen.

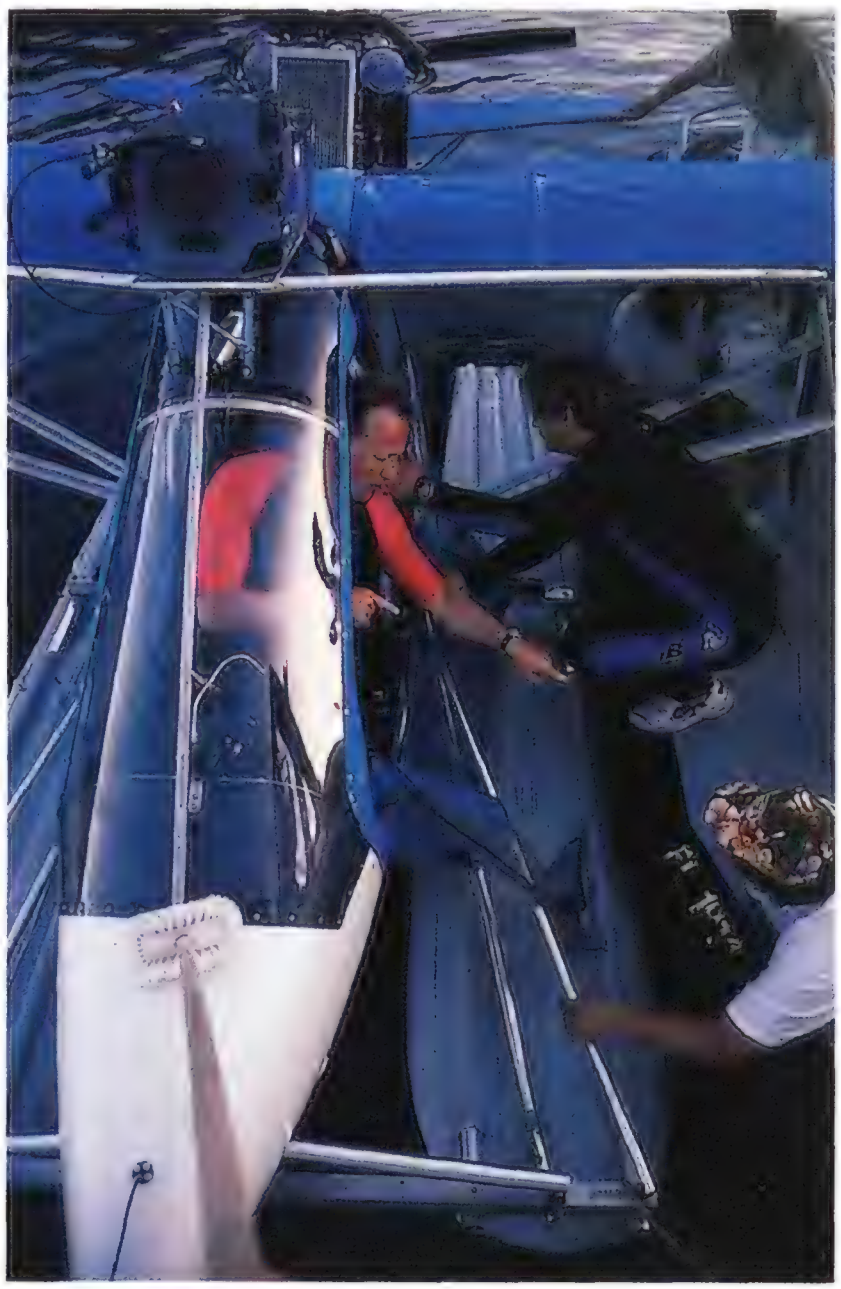
a diaphanous, light-purple scarf that has escaped a woman's neck on a windy day and whisks along the sidewalk. The world's foremost expert on sea cucumbers exclaims with delight, "It's feeding on the sediment," a behavior he has not witnessed before. Later he tells me that below 5,000 feet, sea cucumbers constitute 95 percent of the biomass. Far from the squishy chimney shape that sea cucumbers bring to mind, this creature is otherworldly, embodying a state of grace I've rarely seen.

After capturing the *Pelagothuria*, we find a four-foot squid, several small cat sharks, a fish Pawson refers to as a rattail, a transparent eel, an ugly goosefish with a mouth so wide it looks as though it could swallow itself, a stalked crinoid and a batfish whose pelvic fins are modified for walking. Everywhere there are orange spider crabs, their long arms raised as if in supplication, but in fact they are waiting for the plankton manna to fall from their heaven, the large water column above them. There are boxy jellyfish, fingers of delicate coral as pink as a sunset, and bizarre siphonophores, colonies of a half-dozen medusa-like individuals gathered together in symbiosis. As we rise, Liberatore cuts the lights, and the motion of the submersible agitates plankton fluorescing like thousands of greenish yellow fireworks.

Back on the surface, the creatures that survive the temperature change and the tremendous pressure differential go into the aquarium. The rest are examined, discussed and tagged by the scientists. As many as a dozen new vertebrate species will emerge from the more than 30 submersible dives logged on this trip. While a scientist may describe an equivalent number of new insects in the rain forest in such a short period of time, doing so with vertebrate species at the tail end of the 20th century is unheard of. While tagging these species, McCosker and Baldwin ponder how small fishes made the 600-mile trip drifting in the surface currents of the coastal waters off South America to colonize this remote archipelago.

Perhaps it was in the shipside laboratory that Baldwin got the idea to name two new fish species for Noel Archambault and Bill Raisner, the men who died in an ultralight accident. Within the IMAX community, the 37-year-old Archambault was something of a wunderkind, becoming a master of 3-D technology over the past decade. Creating three-dimensionality is a matter of illusion, something that our brains do effortlessly but that proves difficult to impart in film without causing dizziness and headaches. When we look at an object in front of us—a chair, for instance—each eye returns an image of that chair that is slightly different from the other because each eye regards the chair from a different vantage. (Stare at a chair in front of you with only one eye open, then switch eyes quickly, and the chair will appear to jump.) Our brains integrate the images from each eye into a unified view in three dimensions. Tricking the brain to see three dimensions on a two-dimensional screen involves the careful manipulation of many variables, including focal length and depth of field.

That's one of the reasons why Archambault accompanied Bill Raisner, an experienced ultralight pilot and a former captain in the United States Air Force, when he took a two-dimensional IMAX camera up into the sky to get some aerial shots for the program (which includes regular 2-D IMAX footage as well as 3-D). Raisner had previously taken up a wooden model of the IMAX camera



A tragic ultralight accident killed pilot Bill Raisner and stereographer Noel Archambault (climbing onto the aircraft).

STEVE KING

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Three months later, Cerro Azul erupted, spewing flames and a river of lava across Isabela Island.

to simulate flying conditions with the bulky camera in the Quicksilver GT500 aircraft and was satisfied with the testing. He and Archambault began their third day of filming one Friday morning at 6 o'clock. Whether it was a downdraft, a broken strut, or something else that caused them to crash will never be known. So rugged is the landscape of Isabela Island, it took a harrowing five days to find the bodies, on the northeast sector of the Cerro Azul volcano. Baldwin recalled searching the dark shoulders of the volcanoes from the ship's bridge with binoculars, knowing she would never see anything but needing to try anyway. "We felt so helpless," Baldwin recalls sadly. Producer Dave Clark finally located an Ecuadorean C-130 on the mainland that could ferry a helicopter to the archipelago. The filming process came to a grinding halt, and crew members struggled with whether to continue or to pack it in. Several days later, the crew unanimously decided to continue shooting, determined to honor the memory of their friends. Three months later, Cerro Azul erupted, spewing a river of lava across Isabela Island.

The deaths of Archambault and Raisner, the challenges caused by El Niño, the difficulties of shooting underwater, and the pure raw experience of life and death in the Galápagos Islands not only took its toll on the film crew but actually began to shape the course of the film. Initially, the script featured re-creations of Charles Darwin at work, his head peering through the glass-bottomed bucket, as well as other scenes of his fishhook bumping across the seafloor. These dramatizations came to seem trite and out of place.

Out here, under the waves, and out on the tough volcanic rocks, re-creations of a man who lived long ago seem unable to communicate the power of life and death revealed to the film crew. It wasn't some dusty book that inspired Darwin into thinking about the order of life in new ways, I learn, but the power of the struggle revealed here so vividly wherever one happens to look.

Perhaps the 3-D experience will capture the power of the place for people who cannot get to the Galápagos archipelago themselves. In a sense, this film will let us all experience what Darwin saw in those fateful weeks long ago—not as we often imagine history, in black and white, but in living, insistent three dimensions.

Board editor John F. Ross' most recent book is The Polar Bear Strategy: Reflections on Risk in Modern Life *(Perseus Books, 1999).*

Inside an underwater lava tube off Española Island, Baldwin, the star of the new IMAX film *Galapagos*, swims among a school of creole fish.

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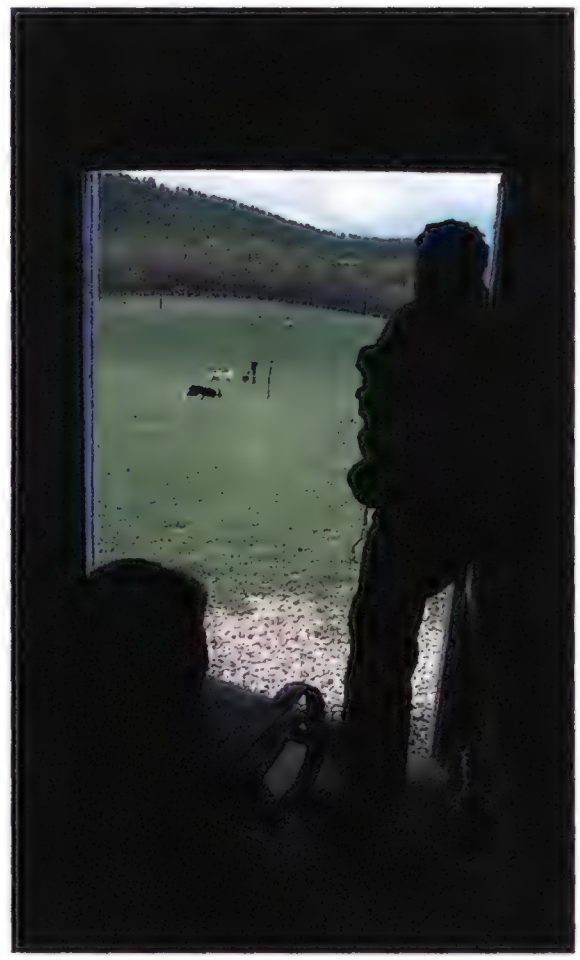
ws What to Do”

"ONE ON THE OUTRUN," MARK BANHAM SAYS. BANHAM IS a young English judge, imported from far-off Surrey to keep evenhanded track of the trial. "One on the lift," he says. Pause. "Two on the lift." Pause. Then, "Oh, dear! Three on the lift." Longish pause. "And one on the fetch."

These are lost points, being subtracted from the 100 points each dog and handler team begins with. Crouched beside him, Mark's wife, Carolyn, jots them down as he calls them out. Sometimes the numbers come thick and fast. It is a windy morning at Seclusival, a series of sheepdog trials in Shipman, Virginia, and because of the wind, contestants say, the sheep are flighty. I am learning why any score over 80 is an achievement, and why, perhaps to their peril, Border collies have lately become such celebrities.

The judge's hut is about the size of three phone booths, with a pointed roof and a doghouse doorway that reminds Banham of a sentry box at Buckingham Palace. Framed by the door, a broad green field swoops down and away, then rises toward a distant fringe of trees. All around this ravishing expanse of Virginia countryside, a succession of smallish black-and-white dogs has been purposefully annoying trios of sheep while, one after another, grown men and women subject them to a blizzard of twittering whistles and loud shouts.

The whistles are weird and indecipherable. Like most people these days who have seen *Babe* or caught a sheepdog trial segment on TV, I have a slight grip on a few words in sheepdog-speak, starting with the two flanking commands, "Away to me" (the dog swings counterclockwise to head off the sheep) and "Come bye" (clockwise reverse). The words we hear most right now, though, are "Lie Down! Lie DOWN! LIE DOWN!" In the eyes of sheep, we are told, dogs are like the wolves they evolved from. A dog flashing toward sheep, even quite far off, makes them nervous. If it comes on too fast or gets too close, the sheep may run out of control; a "Lie Down!" temporarily turns off the pressure.



Watched by the judge, right, dog and sheep are about to complete a "shed."

The stages of the course that dogs and handlers are trying to make the sheep follow are, in order: outrun, lift, fetch, drive (including cross drive and return) and, finally, the twin killers known as pen and shed. Both the latter must be negotiated right under the eye of judge and spectators; failure at either can swiftly dash competitive hope. The prescribed route is in the shape of an arrow. Its shaft, roughly 1,000 feet long, stretches from a peg near the far-off trees where dog and sheep first meet and the lift (setting the sheep in motion) takes place, straight along what is known as the fetch line to the handler and judge.

It looks simple enough. Just send old Shep up there to bring down the sheep. Watched at a distance, the repetitive doings on the field at first produce an effect not unlike being exposed to the same home movie over and over again. Only the pen and shed parts of the course seem close up and personal enough to provide much sense of difficulty. Pen produces those tense and dramatic freeze-frames, with sheep, dog and handler teetering in a will-they-or-won't-they balance, the sheep at left, dithering outside the tiny pen, the handler next, holding its door open invitingly, and the dog crouched at right, glaring, motionless, ready to explode. As to shed, some zillions of children and parents who saw *Babe* know it involves separating out one or more sheep from the rest; they may remember Pig doing this by saying mildly, "If the three ladies with collars would kindly walk out of the ring, I'd be very much obliged."

Long before the sheep reach the pen, however, the pitfalls of this obstacle course appear. Sheep are fractious prey animals. Only partly mesmerized by the dog's wolflike aura, they can get way out of control at any point in each nine-minute run. The handler watches the sheep and the dog. The dog watches the sheep—and listens to the handler. Speed is so much of the essence that, with a dog often working 700 or more feet away, the six- or seven-tenths of a second it takes a whistled command to reach a

In a classic confrontation, sheep dither at the door of the pen as the dog eyes them menacingly and the handler holds wide the gate, extending his crook.

dog can be decisive. Decisions—flank left, flank right, slow, stop, come on—are commanded and countermanded in fractions of a second. They are made by the handler, but ratified and then executed by the dog in an exquisite complexity, with the handler playing god but the dog still capable of free will.

It involves one of the world's most intricate working collaborations between human and beast. A top handler compared the reactive speed required of him during the run to fending off surprise attacks in a computer game. Many handlers insist that they concentrate so hard that if a gun went off they would not hear it. Still, compared with the dogs they have it easy. Concentrating like fury on the sheep, often at a dead run, dogs have to unscramble a flurry of commands (scores of different yells and whistles), then do what's called for or decide against. As a spectator, it is hard not to imagine that the dogs are growling, "If he'd just shut up, I could do my job."

As Mark Banham pushes the start button on the official time clock, the next dog leaves his handler's side and rockets into his outrun. Swinging into a wide, looping curve so as not to scare the distant sheep, and accelerating uphill like a little black-and-white fighter plane on emergency war power, he covers the equivalent of a 440-yard dash in 40 seconds, then slows to a catlike stalk on the far side of the sheep, pads forward and, with no signals from his handler, smoothly stirs them into motion. This is the lift, and like a marriage, if it doesn't begin well, look out! (Sheep are valuable, for wool and meat, so this "should be done gently and carefully," a handler tells me, "as if the ewes were all pregnant and you have to make a living off the lambs.")

In a second, the sheep are striding downhill toward us three abreast and looking like noble beasts. Discreetly behind and to the left, the dog paces right along with them. Banham lets out an approving "Ah." On the fetch, dog and sheep are supposed to move in a straight line, all at the same flowing speed. For an instant the sheep veer just enough to the left so we can glimpse their flanks, then, under the dog's spell, quickly come back on course. "One," says Banham.

Reaching the handler, who stands at a stake 100 feet in front of us, they

make a counterclockwise turn and head off at a 45-degree angle for the first of two gates. "One," says Banham. And again, "One." They have swung a hair too wide, and then begin to drift markedly off course. Mouth open, tongue lolling like a wolf's in a cartoon, the dog pelts desperately past our door, swinging wide so as not to push them farther out of line, heads them, and stops dead. They are back on course, but too late. "Two," Banham says.

A top handler, Lyle Boyer, roughhouses with Jim, Sheila, Clue and Cap. The dogs were all business during the trials—but a few handlers still think off-duty fun is bad for discipline.

This is still a pretty good run. But trouble starts as soon as they make it through one gate and into the cross drive, a lateral run in front of judge and spectators in what is supposed to be a straight line to the next gate. Before the trial, I know, Banham sent his wife out onto the field, to pace a direct line between the gates while he, like a forward observer in the artillery, took note of a series of small tufts or dark patches of grass exactly located on the route the sheep should follow. To my eye they're doing fine.

"One," says Banham. A short time later it is two more, as the sheep swerve upward. "He was way below," Banham explains. "And then he corrected to way above." Having no license to say anything, I find that I've emitted a perplexed "Huh?"

"You have to leave room for perfection," he explains.

Banham has a point, of course. This is the open, or top, class of a major sheepdog trial. Winners will get a big leg up toward qualifying for the National Sheepdog Trial Finals this fall in Middletown, Virginia. More than a hundred dogs and their handlers are on hand, a score both eminent and dangerous, among them North Carolinian Kent Kuykendall and his dog Bill, and Lyle Boyer, here from Michigan with her dog Cap. The hands-down favorite is Alasdair MacRae and his famous bitch, Nan. Twice they have won the National Finals together. MacRae migrated from Scotland to Virginia four years ago to judge trials, raise and sell Border collies and sheep, and give clinics and seminars in dog handling all over the United States and Canada. He is also renowned for his sheepdog-trial version of Kenny Rogers' "The Gambler," with its rousing chorus: "You've gotta know when to flow 'em, know when to slow 'em, know when to flank your dog, and know when to stop."

Another entrant is Donald McCaig, who in *Nop's Trials* and *Eminent Dogs, Dangerous Men* has written about the Border collie better than anyone alive. "Instead of dogs pushing sheep around," McCaig tells me, "think of it as sheep trying to escape." Indeed, steadily watching sheep frustrate dogs and humans has opened the door a crack on what is, for me, anyway, a whole new concept: the psychology of sheep. Being married to a pretty vegetarian while still harboring a yen for the occasional rack of lamb, I usually try to avoid the subject of sheep entirely. But today, from all sides, I am getting the strong suggestion that sheep are complex, sensitive, even fascinating. The least admiring comment I've heard about them went as follows: "Sheep do a lot of dumb things, but they're real smart."

Almost all the top sheep-trial handlers keep sheep, and many are farm-

ers who need Border collies, because you can't begin to make a living out of sheep without a dog. But the ability to interpret the prey-animal quirks and phobias of sheep, to read their body signals, it appears, is what separates OK dogs and handlers from the handful of greats. This trial takes place at and gets its name from Seclusival, a 200-year-old farm with 400 sheep that belongs to Barbara and Steuart Ligon. Barbara is the trial's host and presiding officer, as well as one of the best dog handlers and trainers in the country. "Sheep," she tells me, "will never forgive a dog that rushes them too much." Sheep forgive? Moreover, she goes on, "some dogs put sheep into a snit just by being around; others can just naturally settle sheep down. It's a great gift."

It also appears that, surrogate wolves or not, some Border collies impress sheep as so lacking in conviction that they will simply drive the dog out of the field.

I have toyed with the notion of a silly ewe-are-there interior monologue. Something like: "I won't go in that pen! Whenever those wolves get us in a box, the men stick needles in us. Shear off our coats. Or take our babies to make lamb chops." But should that be: "I won't go in because that pseudo-wolf is hustling me?"

Clearly, it's time for a break. I quit the Banhams and the dark sentry box, reflecting that to properly understand these trials you'd need some kind of three-way telepathic circuit, broadcasting in simultaneous translation not only dog and sheep talk but a decoded version of the handlers' whistles as well. As spectator sports, baseball and football are pretty easy to empathize with, even for duffers. Tennis, too. After lengthy interviews with Clark Graebner and Arthur Ashe, John McPhee in *Levels of the Game* unforgettably re-created a tennis match from inside both players' heads. But in a sheepdog trial, representatives of three separate *species* are subliminally collaborating—and two of them don't speak English.

Up on the sunny spectator's ridge behind the judge's hut, lunch can be had and the general scene is cheering. People have come from as far away as Michigan and Montreal and Florida, borne in an array of dog-laden vehicles, from fancy, gigantic trailers to battered pickups, sport utility vehicles and what one contestant referred to as "Motel Subaru." Dress of the day is work clothes, billed hats and boots. For lunch, you can gulp beans or hotdogs or chili with Coke or coffee, followed by doughnuts or brownies. The only shelter from a bright spring sun is two big, floppy tent tops, the only seating a couple of dozen folding chairs, many with proprietary names scrawled on the back.

There are Border collies everywhere. Big dogs doze in their crates, sprawl around in the shade of trucks and trailers, or sit behind the wheel, with windows open, as if driving. A few puppies try to shake the life out of one of the scores of caps, labeled "JOY," handed out by the eponymous dogfood company that has helped finance the running of these trials.

Rear end high, head and tail low, a Border collie seems to stalk sheep, glaring intently, often pausing or moving slowly like a cat about to rush an unwary bird.

Among sheep and Border collie people, it turns out that whether you're rich or poor, librarian, geneti-

cist, doctor, lawyer, farmer or Indian chief, the custom is not to hire a fancy handler to run your dog. You do it yourself. This means that when you compete, you have to be out there with dog and sheep, as exposed as a prima donna at the Met, claiming the two of you are good enough to be there. Often raw humiliation ensues, administered by sheep, for heaven's sake, or a dog (and the watching handlers all know this) who knows the job better than you do.

Border collies are obsessive-compulsive. They are also capable of working themselves to death for their owners. Besides herding sheep, their ruling passion is to turn everything they do—even play—into work. Mine, for instance, has no sheep, but if you interrupt a backyard Frisbee session by offering a bit of dog biscuit, she spits it out contemptuously and glares at you, demanding another throw. One way handlers discipline Border collies is to refuse them the reward of working sheep.

An unusual sight at sheepdog trials, two youngsters in a golf cart offer a puppy for sale.

Border collie owners are obsessive, too, especially if they've been bitten by the trial bug. Some are born to Border collies and sheep. Some come to these dogs after training other breeds. One elegant woman, after years as an avid foxhunter, even gave up horses and hounds for sheepdogs. Remembering a run with a score of 84, she says, "The thrill is brief, but there's nothing like it." Characteristically, she has never looked back.

Some get suckered in by sheer chance. "Meet our million-dollar 'free' dog," says Dal Kratzer, introducing McEwan, who was given to the family as a gift. Bitten by the training bug, the Kratzers bought Speck, from Michigan neighbor Lyle Boyer, and then Paddy. All of a sudden they had three dogs—but no sheep. Sheep need a barn. Before they knew it, they had sold their house in town and built another beside a barn. And so it went, like the Rake's Progress, only their path, they feel, led not down but up, to a blissful codependency somewhere near the heart of the world. For their owners, the Border collie's unquenchable thirst for work is what in drinking circles is called an enabler. The result is reciprocal obsession, and often as not, a comradeship that passes understanding.

"Tears come to my eyes just thinking of what the dogs can do," Barbara Ligon admits. "If three people tried to get three sheep into a pen by themselves, they could be out there for months." At some state fair sheep trials, young men in the crowd are sometimes invited to try just that, with lengthy, comic results.

I found myself talking to a computer expert just after his ruined run, in which during the lift all three sheep headed for Montreal. "I blew it," he groaned. "He read them right, but I gave him the wrong commands." He seemed as shamed by letting down his dog as those characters in the sports stories of my youth, who missed that placekick against Yale and never recovered. Donald McCaig records a similar incident, but from the dog's point of view. McCaig's miscue so outraged his dog Pip that, riding home, "Pip was so mad he wouldn't look at me. He wouldn't meet my eyes for three days."

Over doughnuts and coffee I meet Alasdair MacRae. On their first run he and Nan had "difficult sheep." On their next they seemed bound for victory. The best score till then had been a remarkable 95 by Kent Kuykendall and Bill. But going into the shed, MacRae and Nan had only three points off, and seemed headed for a spectacular 97. In American sheepdog trials, only one of the three sheep has to be herded out of the chalk circle, leaving the other two inside. Unlike in *Babe* and most British trials, at Seclusival the one to be shed does not wear a collar but is simply the sheep in the rear when the shedding is tried. That seems simple enough. Sheep switch around a lot in the circle, though, with the last becoming first, and vice versa; I found I could never tell which one it was, and even some of the handlers had their dogs cut out the wrong sheep.

The shed is supposed to be primarily a canine tour de force; once it is clear which sheep is to be shed, the dog needs to go against its deep instinct to keep sheep together, in-

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In *Babe*, a disarming film about a pig who becomes a sheepherding wizard, the hero passes the time of day with his protective foster mother.

stead flashing in as it has been trained to do, splitting them apart and edging the proper one out of the ring. For MacRae all went swiftly and well until that defining second. In that second Nan held back and they lost ten points. Why? I asked MacRae. "Oh," he says mildly, "she just decided against it." There is deep affection in his voice, and worry. Nan is 9 years old. Has he ever seen 100 scored? I ask. "Once." Slight pause. "I wouldn't have scored it so high myself." What was his own best? "Ninety-nine and a half." What was the half for? "Oh," he said, "a little bend." By that time, thanks to Mark Banham, I thought I knew what he was talking about.

So it was that by late Sunday, under a complicated system that rewards the best marks for each of the two days separately, and includes a combined overall score for both, MacRae came in the equivalent of third, behind Lyle Boyer and her dog Cap. The big winners, with a 95 and a 92, were Kent Kuykendall and Bill, genially described by his owner as a "big goof who loves kids."

Talking about their two successful runs, Kuykendall reflected on the paradox of human command versus canine initiative. "It's a very delicate thing," he says, "one of the most controversial questions with regard to training." Speaking of Bill, he says, "On his outrun I saw he knew where the sheep were. When he got near I saw one ewe raise its head. But Bill noticed it, too, and slowed. So I left it up to him. You let the dog do it when it's in control of the sheep. At pen I made the mistake, not Bill. He wanted to pick 'em up quick and get 'em in, but I gave him a 'stand.' The sheep paused in the mouth of the pen and we lost a point."

Some dogs need total control and reassurance. Some can be too headstrong. How does a dog disagree with a command, I wondered. "They check on you sometimes," he says. "On the cross drive they will glance over. It's like a 'What did you say?'" Kuykendall believes that training your dog to be too dependent on control kills initiative. Unstated but implicit, I think, is the view that many handlers overcommand, and are harsher than they need be. Or don't train the dogs well enough, and then have to yell at them too much. "They want to please," says Kent, "just so they can have the sheep." All of a sudden, we're back to the basic paradox, or is it a mantra: "A good dog knows what to do," he says. "And also does what he's told."

It is getting on toward dusk on Sunday when the Ligons and their volunteer helpers, having totted up the scores, produce a lot of prizes and a few jokes. There are many ribbons won, as well as new folding chairs (useful for the next trial) and 25-pound bags of Joy dogfood. But it is the least-commercial competitive event you could imagine. Some of the cash winners do not begin to get enough to pay for the gas it took to bring their big rigs from out of state, and even the top money is measured in hundreds of dollars. If there is a commercial advantage to winning, it is in higher stud fees for the winning dog or higher prices for its puppies.

In proud distinction from the American Kennel Club, which breeds largely to physical conformity, often producing what Border collie people describe as "the beautiful and dumb," the American Border Collie Association and its members aim at preserving an ancient line of working dogs, notable for energy, brains and the sheer ability to get a demanding job done. "The dogs are always good," a handler tells me, "because they're always proved. The trial itself is our breeding strategy."

"The shepherd's dogge," a physician in the court of Queen Elizabeth I wrote, "either at the hearing of his master's voyce, or at the wagging and whistling in his fist, or at his shrill and hoarse hissing, bringeth the . . . straying sheepe into the self same place where his master's will and wishe is to have them." That was in 1576. For centuries and centuries before and since, shepherds' dogs have been fetching sheep down out of the hills rain or shine, seven days of the week as a matter of business and necessity, without much fanfare.

It was not until 1873, in Wales, that the first sheepdog trial on record took place. It was won by William Thomp-

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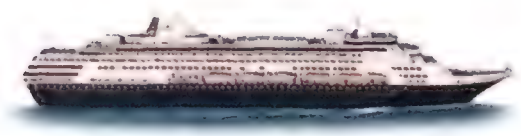
TODAY IN EUROPE
A string quartet is playing at sunset off the Riviera,
there's a lecture on the Hermitage en route to St. Petersburg,
saffron paella is being prepared near Barcelona,
someone is enjoying a massage off Capri.
SHIPS REGISTRY: NETHERLANDS, BAHAMAS



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Hidden from the course by a board cubicle, Canadian competitor Amanda Millikin and Hazel commune briefly a moment or two before they take the field.

son and his dog, Tweed. It had no point-scoring system, nor time limit, I'm told, but like today's trials, it required a display of nearly all the many skills working collies need. Year after year the trials became a celebrated showcase for Border collie talents. Today the little dogs have reached considerable celebrity.

A few years back, a much-publicized study designated them as (by some measures) the smartest dogs in the world. They've turned up in Gary Larson cartoons and on TV variety shows. They're rented out to chase geese off golf courses. They dominate the world of Frisbee competition and the high-speed bark fest known as flyball. A voluminous Website, "All About Border Collies" (www.bordercollie.org/core.html), put together by the United States Border Collie Club, Inc., has had more than 80,000 hits this year. Though considerably upstaged by a pig, Border collies helped make *Babe* a huge hit.

Most Border collie people deplore one result of this fame, which they refer to as the "*101 Dalmations* effect." After every reincarnation of that film, thousands of small children living in city apartments dragoon feckless parents into getting Dalmatian puppies. A cruel percentage of the dogs soon wind up abandoned, some left at animal shelters with little hope of adoption, some left behind at the end of summer vacation, or even dropped out of car windows. Since *Babe*—despite warnings by many canine organizations that these dogs aren't good pets, that they can be miserable and destructive if left at home with no training or work—groups like the National Border Collie Rescue Organization have been working overtime.

The popularity of sheepdog trials is also growing with faddish speed. Fifteen years ago there were few female handlers. Now, despite many a domestic demur, well over a third are women. A youthful competitor told me, "My husband says, 'You love that dog more than me.' I say, 'Well, *he's* always trying to please me.'" Fifteen years ago there were only a dozen or so qualifying trials each year; now there are at least 250, with more and more "hobby handlers" from cities and suburbs joining in.

At least two glossy publications, *American Border Collie* magazine and *The Working Border Collie,* reflect this trend. Both comment seriously on sheepdog trials, the handlers and training necessary. Both carry ads for dogs, sheep, training clinics, books and videos on how to learn, and the artifacts of sheepdogolatry: shepherd's crooks, Border collie photographs and coverlets, the little half-moon-shaped whistles most handlers use, caps, jewelry, mugs, stickers, figurines, silver buckles. One features a department called Ewesful Things.

And what's wrong with that? I find myself wondering on the long dark drive home. From the Border collie's point of view, probably nothing, unless a lot of money begins to change hands, or standards are lowered to please crowds or sponsors. Even then, the collies won't care, as long as nobody tries to pretend that what they're up to is anything but dead serious.

Contributing editor Timothy Foote admits to sometimes liking dogs better than people. Lynda Richardson, a dog lover as well, specializes in animal photography.

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Female Premiums

Age	10 YEAR	15 YEAR	20 YEAR	25 YEAR	30 YEAR
35	$ 103	$ 125	$ 145	$ 183	$ 205
40	$ 123	$ 158	$ 185	$ 238	$ 260
45	$ 190	$ 215	$ 253	$ 330	$ 385
50	$ 253	$ 290	$ 363	$ 490	$ 495
55	$ 360	$ 413	$ 550	$ 835	$ 1,015
60	$ 503	$ 608	$ 845	$ 2,135	$ 2,400
65	$ 775	$ 975	$1,593	$ 3,900	$ 3,900
70	$1,338	$ 1,600	$2,970	$ 7,220	$ 7,220
75	$2,275	$ 4,870	$5,820	$10,440	$12,420

Male Premiums

Age	10 YEAR	15 YEAR	20 YEAR	25 YEAR	30 YEAR
35	$ 123	$ 138	$ 165	$ 223	$ 253
40	$ 148	$ 183	$ 225	$ 288	$ 335
45	$ 225	$ 300	$ 360	$ 450	$ 513
50	$ 338	$ 455	$ 525	$ 730	$ 828
55	$ 500	$ 670	$ 768	$ 1,638	$ 2,330
60	$ 783	$ 990	$1,265	$ 3,630	$ 3,630
65	$1,330	$ 1,650	$2,693	$ 5,250	$ 5,250
70	$2,448	$ 3,175	$4,860	$ 8,790	$ 8,790
75	$4,400	$ 7,443	$9,600	$13,260	$15,030

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Dodge Different.

Grits go gourmet (clockwise, from above): salmon fillet over creamy white grits; poached eggs with pearl hominy hash; fried pork chop and white grits; yellow grits cake with tasso gravy; and shrimp and sausage with white grits.

BY TIM WARREN

PHOTOGRAPHS BY KELLY CULPEPPER

True Grits

GRITS ARE GETTING DRESSED UP AND GOING TO UPSCALE RESTAURANTS,

BUT THOSE WHO LOVE 'EM MOST STILL LIKE 'EM BEST AT HOME

JANE LOVETT LEARNED TO LOVE GRITS BY ROMANCE AND happenstance. She grew up in Philadelphia, the city of cheese steaks, scrapple, soft pretzels and cream cheese, where grits were as ever present as, well, roasted camel.

As chance would have it, her neighbor, a Southerner named Mrs. Jolly, let her taste grits as a young girl. Her reaction was like that of most non-Southerners: she didn't like them one bit.

Her eyes twinkle as she laughs at the memory. As an adolescent she moved South, eventually going to college in Tennessee. She married John Lovett, an industrial engineer from Arkansas, and hasn't lived in the North since. But it wasn't until she and John decided to buy a restored 1873 water mill in Belvidere, Tennessee, that she went hog-wild for grits.

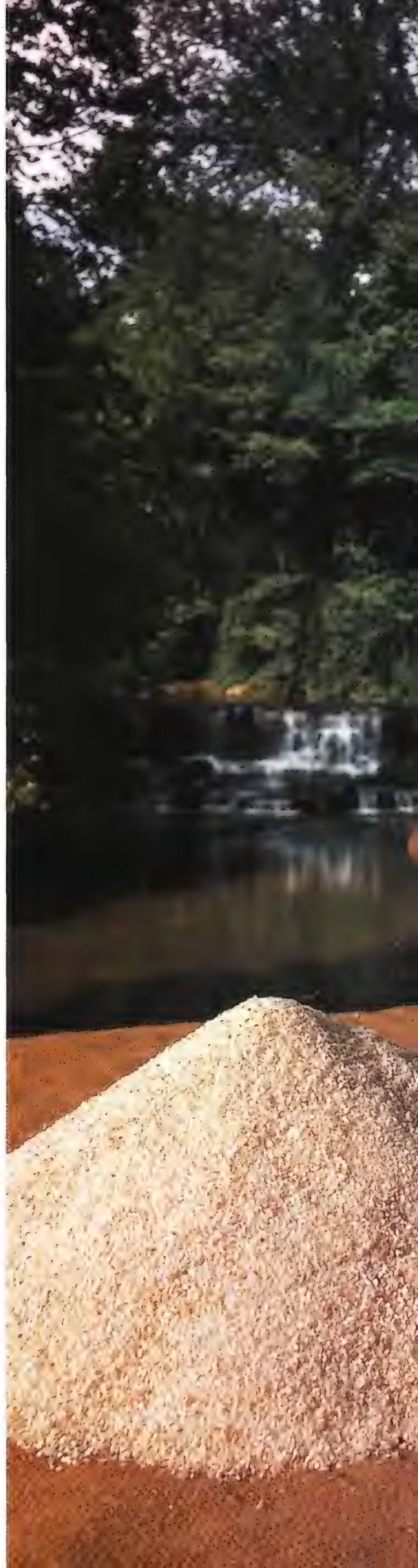
Belvidere is a sleepy little town amid the rolling farmlands of south-central Tennessee. After Lovett and her husband completed additional work on the mill in the late 1980s, they looked around for new foods to produce. Somebody suggested grits, a logical choice because they come from milling white corn, which blankets the fields of Franklin County. What better to make than grits, the signature food of the South?

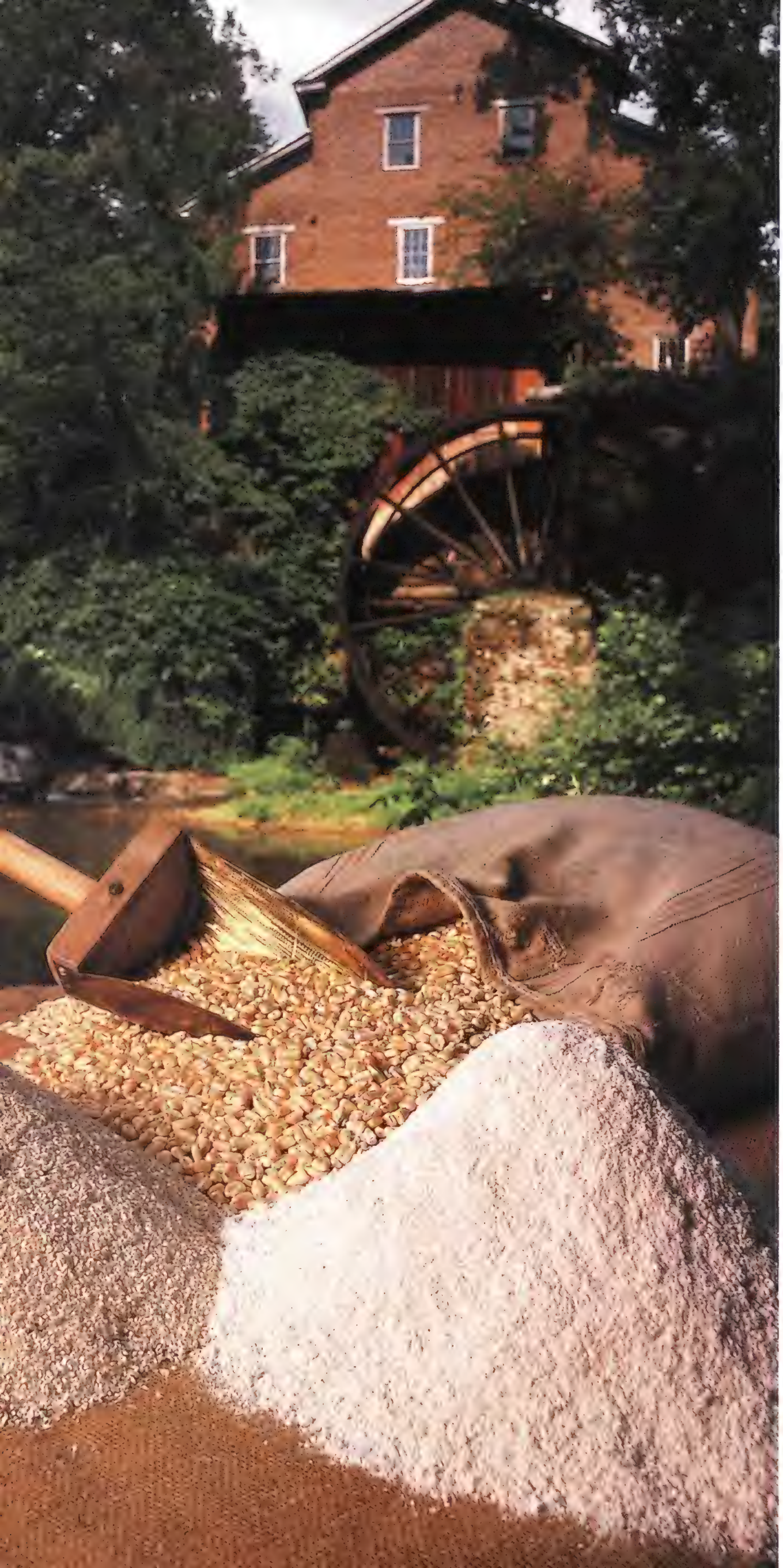
Shortly after they began making grits the phone calls started pouring in from all over the country. Most often, they came from transplanted Southerners. "People sounded so . . . *desperate*," says Lovett. "They'd say, 'Out here in South Dakota, you just can't get good grits.'" That's when she began to see just how strong the connection is between Southerners and their grits.

Ever since the Lovetts started milling grits, they have struggled to keep up with the demand. During my visit to Falls Mill on a recent May afternoon, Jane had just shipped two- and five-pound bags all over the country—a total of about 800 pounds. She ticked off some of the destinations: Charleston, South Carolina; Dallas, Texas; Spokane, Washington; Trenton, New Jersey; Toledo, Ohio. Falls Mill ships about 36,000 pounds of stone-ground grits annually. Some of the grits will go to upscale restaurants, places where this traditionally humble food is dressed up in exotic dishes and now occupies a position of honor on the menu. Many large American cities have a restaurant featuring grits as the centerpiece of its New Southern Cuisine menu. Grits, it appears, have come into their own.

For those of us who have loved this food since early childhood, it's about time grits got a little attention. Call me a grit—a derogatory label for a Southern white—I don't care, but I love my grits. Often misunderstood, often denigrated, grits deserve a kinder fate. When Lovett takes me back into her cluttered office at the mill, I can smell the grits cooking on the hot plate before we step in the door. It brings forth memories of home and childhood. Warmth and conversation. My family sitting around the table on Saturday morning.

I learned to like grits from my mother, who was from Virginia, and my father, who was born in South Carolina and grew up in Atlanta, Georgia. I absorbed my father's love of the simple, stick-to-the-ribs Southern foods he grew up with, such as





grits and corn bread. He would go away on a business trip, where he would eat at some fancy restaurant, and then come back to discover that we had partaken of a down-home delicacy in his absence.

"You people ate black-eyed peas? And grits?" he would cry, scarcely concealing his envy. My mother was only trying to feed seven children cheaply, but as far as he was concerned, we had gotten the better end of the deal.

The consistency of the grits that Lovett has made is just right. Grits shouldn't be so runny that they spread over your plate, nor should they be so thick that they clump.

If truth be told, one shouldn't eat grits plain. Really good grits almost melt in your mouth, and because they are essentially neutral in taste, they bring out the flavor of the seasonings, gravies, sauces and other foods that are added. Lovett adds some sharp cheese to her grits, and they are delicious. I eat quickly, hoping that she'll offer me another spoonful. She does. The grits settle in my stomach, warm and filling, and impart an intense feeling of well-being.

I've heard people compare grits to library paste. To those people and many of my Northern friends, I say you just don't know how to eat them. Too often a first grits encounter resembles that experienced by the New York lawyer played by Joe Pesci in the film *My Cousin Vinny*. In a small town in Alabama while trying a case, he and his girlfriend order a breakfast of bacon and eggs. Along with breakfast comes a mass of a white puddinglike substance. And it doesn't look like oatmeal.

"What's this over here?" Pesci asks a little nervously.

At Tennessee's Falls Mill, white corn is ground into grits, left, and cornmeal.

William "Butch" Janey, the longtime miller at Falls Mill, packages fresh stone-ground grits into 25-pound sacks for shipment to restaurants across the country.

"You never heard of grits?" answers the cook.

"Sure, sure," says Pesci. "I heard of grits. I just actually never seen a grit before. Here, honey, you gonna try it. You first."

His girlfriend shakes her head in disgust at the thought.

"What is a grit anyways?" Pesci asks the cook.

When confronted with grits, most people take a nibble, think they're awful, and never try them again. Bill Neal and David Perry, in their *Good Old Grits Cookbook*, describe the proper way to eat grits: "Y'all got your forks? Okay now, cut into one of the eggs and let the yellow run toward the grits. Fork up some of those grits. Now get you a piece of sausage on the end. Drag the whole thing through that yellow egg juice. Eat it." I can attest that they also taste wonderful with red-eye gravy.

Whatever your opinion is of grits, you can't deny their historical significance. It can be argued that grits were America's first food. The Powhatan Indians of Tidewater Virginia introduced the earliest Virginia settlers to a hot and filling porridge made from cracked grains of maize. Capt. John Smith wrote about grits as early as 1629 in his notes about the behavior of the Virginia settlers: "Their servants commonly feed upon Milke Homini, which is bruized Indian corne pounded, and boiled thicke, and milke for the sauce." The Indians called it *ustatahamen*, perhaps the source of today's term "hominy." "Grits" derives from the Old English word for the bran and chaff of any kind of grain—not just corn. (Today, "grits" can be used both as a singular or plural noun. In other words, both "grits are" and "grits is" are acceptable.) "Hominy" has come to refer to corn soaked in a solution of water and lye to remove the husks before milling into grits. Maize, or corn, had been brought back to Europe by Columbus. A New World discovery, corn was domesticated 5,000 years ago and maybe earlier in central Mexico from a wild strain of maize. By the time John Smith and other Euro-

P. 81 TOP TWO: PHOTOGRAPHED AT MIDDLETON PLACE, CHARLESTON, SOUTH CAROLINA

Little dogs are still cute when they grow up.

Extraordinary food for extraordinary dogs

peans colonized North American shores, the Indians were cultivating corn as far north as southern Maine. Pocahontas would certainly have been no stranger to grits.

The Indians pounded the lye-soaked corn with handheld pestles in large wooden mortars. The colonists did their pounding with "hominy blocks," which soon became a common fixture at homesites and settlements in North America. The hominy block reduced the effort involved in grinding by using a log suspended from a springy limb as a massive pestle. So loud was the thumping of hominy blocks that fogbound sailors just off the East Coast could sometimes tell that they were nearing land.

Corn and pork became the dominant ingredients of Southern cooking, a cuisine infused with Native American, African and Western European influences. Corn was a mainstay because it was hardy enough to withstand the South's long and hot summers—unlike wheat, for instance—and because it could grow in many different kinds of terrain. By the 19th century, the North had made wheat its dominant starch. In the South, however, corn still ruled. Every town needed at least one mill, which became a social hub of sorts.

Early accounts of Southern eating habits often include a reference to grits, but many do not. In fact, Sam Bowers Hilliard, a professor emeritus at Louisiana State University at Baton Rouge, contends that grits were not a universal staple in the South until the Civil War, when they became an increasingly important part of the diet. In the years before the war, grits and hominy were eaten, of course, but not nearly as much as corn bread.

It was the economic deprivation during Reconstruction that brought grits to the forefront of Southern cuisine and entrenched them firmly in the belly of Southern culture. Southerners ate grits. They ate corn on the cob and a number of dishes made from cornmeal, including hush puppies, corn bread and spoon bread. And, they ate more grits.

Tennessean John Shelton Reed, a professor of sociology at the University of North Carolina at Chapel Hill, writes that "Grits glue the South together, if you'll excuse the image."

To appreciate how fond Southerners have become of grits, one only has to visit St. George, South Carolina, in April for its annual World Grits Festival. Tens of thousands of grits lovers, as well as the merely curious, crowd into the self-styled "Town of Friendly People" an hour west of Charleston for three days of homage to their favorite food. Activities include corn-shelling contests and grits-eating competitions (right), in which the winner is the first to hold up an empty bowl. Over the course of three days, festivalgoers work through about 3,000 pounds of grits.

The festival's parade features not only the Grits Queen, but also Baby Miss Grits, Junior Miss Grits and Teen Miss Grits, and a perennial favorite, the Grits Sisters. They are nine women from a bridge club in the St. George area who, wearing matching lime-green shirts for this year's festival, toss sample packets of instant grits to the crowd.

Then there's the festival's signal attraction, the Rolling in the Grits competition (left). Contestants dive into a kiddie pool filled with grits and have ten seconds to coat themselves with as much of the glop as possible. Since the winner is the one with the most pounds of grits on his or her person, savvy entrants wear big hats and loose pants with lots of pockets. This year's winner in the children's category, 14-year-old Joshua Howell, packed an astonishing 35 pounds onto his frame. All this for a $75 first prize and the opportunity to discover, as a festival volunteer tells me, that "grits may taste good, but they stick in your hair forever."

Contestants in the Rolling in the Grits contest at the World Grits Festival in St. George, South Carolina, have ten seconds to pack as many grits as possible onto themselves.

With the words "One, two, three, eat grits!" these 10- to 13-year-olds race to empty containers filled with three cups of grits and win a trophy.

While it certainly wasn't as gonzo as St. George in mid-festival, I remember when a grits craze briefly hit Washington, D.C. in the late 1970s, thanks to the election of President Jimmy Carter and Vice President Walter Mondale, infamously known as "Grits and Fritz." Grits showed up on the menus of restaurants in Washington and New York, but the fascination with them soon faded.

In the 1980s, several influential Southern food writers helped spark a grits renaissance. In 1985, *New York Times* food writer Craig Claiborne visited Bill Neal's restaurant in Chapel Hill, North Carolina. Claiborne raved about Neal's shrimp and grits in a subsequent column, and soon food writers and food lovers around the country were taking grits more seriously. Grits feature prominently in more than a dozen cookbooks today.

Now, at the Linwood Grill and Barbecue in Boston, homesick Southerners can feast on cheese grits, but so can New Englanders more familiar with broiled scrod and baked beans. "It's a bit of an educational process for our customers, because we offer traditional Southern regional cuisine—grits, collard greens, barbecue," acknowledges Todd Carey, the executive chef. "But once people try grits, they're hooked. People come out to try something new. And grits, really, are a comfort food."

Grits are going upscale as well. In Charleston, one of the centers of New Southern Cuisine, restaurant after restaurant offers its own version of the traditional Lowcountry dish of shrimp and grits. At the elegant Magnolias restaurant, founding chef and co-owner Donald Barickman and executive chef Don Drake have found any number of uses for grits. Their spicy shrimp and sausage with tasso gravy over creamy white grits has become such a success, Drake says, that "people would hang us if we stopped making it."

The key to making good grits all these cooks agree is using fresh stone-ground grits. "The grits in the grocery store are garbage," declares Charlestonian John Martin Taylor, whose Lowcountry cookbooks call only for stone-ground grits. "They will never rise out of the diner status they deserve—and it's no wonder that people hate them."

The Quaker Oats Company and other larger processors use steel rollers to mill corn into grits. The hulls of the kernels are loosened by soaking them in water for several hours, and during the process much of the corn is broken off, leaving only the endosperm to be ground into grits. The resulting product is much finer than stone-ground grits and, to

Always a crowd pleaser, the Grits Sisters toss packages of instant grits to eager spectators from atop their float in the World Grits Festival parade.

some, much more bland as well. The advantage is that these grits can be prepared much more quickly. Quaker's instant grits, which are added to hot water and are ready in seconds, now make up nearly a third of its grits sales of 65 million pounds annually. All told, Americans eat about 100 million pounds of grits each year.

Falls Mill and other water mills grind the corn whole, so the oily germ and the starchy endosperm are retained. Stone-ground grits are high in oil, vitamins and flavor. But while stone-ground grits may be more flavorful, they are a lot more work to prepare than the quick and instant grits that dominate the market. Since stone-ground grits contain all of corn's oils, they can go rancid quickly unless they are refrigerated. Also, they must be cooked at least 30 to 40 minutes. Don Drake of Magnolias says his restaurant will cook its grits up to four hours.

The manufacturing process at Falls Mill is anything but quick and easy. No electricity is used; the only source of power is Furnace Creek, which has been dammed a few hundred feet away. The water is diverted through a flume or millrace toward the steel and cast-iron waterwheel, which is 32 feet in diameter and was built in 1906. As the water turns the wheel, the power generated is transferred inside the building by means of pulleys.

The mill itself is a wooden casing about five feet tall that contains the two circular granite millstones. The larger one weighs more than a ton, John Lovett says, and is on top. As the corn is poured into the mill, the larger stone begins rotating and grinding the corn against the smaller, stationary stone. More than half of the ground corn comes out as powdery cornmeal, for which there is not nearly as much of a market. "We sell half of it to hog farmers just to get rid of it," he says.

And, he says, milling is hard, hard work. "A lot of people have no idea how much heavy lifting we have to do," Lovett says with a slight, knowing smile, at once weary and proud. "You have to move large amounts of grain around. You have to clean it, grind it and bag it. You have to transport it. I've seen people lose interest in doing this work after a pretty short time."

Back in her office, Jane Lovett is bagging more grits—about a hundred small sacks to be sent to a big hotel in Nashville that wanted to give its clientele a taste of the real Old South. No doubt there will be conventioneers from Chicago and Seattle and Minneapolis who will look at these little bags of ground-up corn and not see history or tradition, or the makings of one of the most satisfying dishes imaginable.

But that's all right. Maybe grits are just not meant for everyone. Look at what happened to bagels, and tacos, and pizza, all foods that lost their regional or ethnic cachet once they became popular and part of the culinary mainstream. Grits, I think, don't travel especially well.

No, grits belong at home. I know many Southerners, in fact, who don't like eating grits even in local restaurants because they don't trust strangers to cook their favorite food. I don't go that far, but I see their point. Even when I have tried the trendy and upscale fare of such restaurants as Georgia Brown's in Washington, D.C., or Magnolias or 82 Queen in Charleston, there's something vaguely discomforting about seeing something so basic being dressed up so much. It's sort of like sending a mule out to run in the Kentucky Derby.

I suspect my father would have felt the same way. I'll never forget his delight at sitting down with a simple bowlful of grits, with all the associations of a childhood in Atlanta. Maybe, when he grew up, grits brought back memories of his father, as they now do with me. It's something we share: with grits, all the world's a Saturday morning.

Washington, D.C.-based writer Tim Warren orders pancakes when he can't find grits. Kelly Culpepper's photographs of North Carolina potters appeared here in October 1998.

The Desert That Glistened With Water.

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The Eye of Paris

FROM MIST-SHROUDED MONUMENTS TO GRITTY STREET SCENES, THE 20TH-CENTURY PHOTOGRAPHER **BRASSAÏ** CREATED A COMPELLING PORTRAIT OF COSMOPOLITAN LIFE ◆ BY AVIS BERMAN

For three decades, Brassaï's penetrating eye—captured at right in French photographer André Villers's 1981 portrait—focused on the urban landscape of the City of Light. His evocative 1949 view of the Pont Neuf (detail above), with its rhythmic reflections, suggests why he was dubbed the "poet of the night."

SIXTY-SEVEN YEARS AGO, AN EPOCHAL BOOK OF PHOTOGRAPHS APPEARED. Entitled *Paris de nuit* (*Paris by Night*), its pages lingered not only on the sights available to every pedestrian in the French capital—the misty beauties of parks, monuments and bridges—but also on the unsuspected face of the city's underworld. Men and women who made their living from pleasure, vice or crime went about their business before the camera, collaborating with its intrepid gaze. The author of the volume was a Hungarian artist named Gyula Halász. He had settled in Paris in 1924 and later adopted the pseudonym Brassaï, meaning "from Brassó," after his birthplace in Transylvania. After a bohemian youth, during which he experimented with drawing, painting and writing, Brassaï focused on photography as the medium that would help him best express the spirit of his times.

Paris de nuit established Brassaï's place in photography immediately and irrevocably, but such a dominating achievement also tended to obscure his versatility. Brassaï never restricted himself to one subject, theme or genre. For the next three decades, he pointed his lens at the whole spectrum of humanity across Europe and the United States, creating some of the most compelling images in 20th-century photography. The scenes of "Paris at night, however significant, represent only a fragment of a much greater vision that the artist pursued with deliberation," writes Anne Wilkes Tucker, curator of photography at the Museum of Fine Arts, Houston, and organizer of "Brassaï: The Eye of Paris," a retrospective exhibition celebrating the centenary of the artist's birth in 1899.

This view of Brassaï—that he was a man who seized on a variety of things in the world and made them unforgettable—is the main premise of the show, which features some 140 photographs spotlighting such themes as dance, the demimonde, high society, artists, laborers and graffiti. Also on view are Brassaï's published books, and examples of his drawings and sculpture. Curated by Tucker, who spent 15 years researching Brassaï's career, the exhibition opened in Houston and traveled to the J. Paul Getty Museum in Los Angeles. It can be seen at the National Gallery of Art in Washington, D.C. from October 17 through January 16, 2000.

Intrigued by Salvador Dalí's "large moonstruck eyes," Brassaï made the first of many portraits of the famed artist in 1933.

This unsurpassed chronicler of cosmopolitan life was born in a prosperous small town that was part of the fading Austro-Hungarian Empire. One of three sons of a professor of literature and his wife, Gyula Halász was a social, artistic boy who had absorbed his father's love of France since he was a toddler. The family resided in Paris in 1903-04 while the senior Halász took a sabbatical to study at the Sorbonne. One of Brassaï's earliest memories was of pushing his toy boats around the pond in the Luxembourg Gardens with a long pole. As a mature artist he relived his boyhood through this image, taking pictures of children playing in the gardens.

After serving in the Austro-Hungarian cavalry, Brassaï briefly attended the Academy of Fine Arts in Budapest. Following World War I, the Austro-Hungarian Empire was dismembered, and Hungary came under Soviet influence. Transylvania was taken from Hungary and given to Romania. These changes caused much of the Hungarian avant-garde, including Brassaï, to flee. He wanted to go to Paris, but Hungary and France had been enemies during the war, so he made for Berlin.

Arriving in Germany in December 1920, Brassaï embarked on a career as a journalist, writing articles for several Hungarian publications. At first he reported on sub-

J. PAUL GETTY MUSEUM, LOS ANGELES; P. 90 COLLECTION OF JAMES EDWARD MALONEY AND BEVERLY ANN YOUNG; P. 91 MUSEUM OF FINE ARTS, HOUSTON

jects that he knew little about, but in time wrote increasingly on the arts. He also enrolled in the Berlin-Charlottenburg academy, but was a desultory student and showed up mainly to avoid being drafted into the Romanian Army. His long, unruly hair reinforced the image of a rebellious bohemian. The coiffure set off his heavy, tortoiselike eyes, which were the first thing people noticed. Brassaï's unconventional appearance was matched by his capacity for witty ad-libbing. While in the company of a group of young Swedish women, he was asked where he was from. When he replied that he was "Armenian," they requested he teach them the language. Brassaï related that he "responded willingly, making up some impossible words by combining the names of all the Armenian foods I knew."

In Berlin, he met many other artists, among them Lajos Tihanyi, a prominent Hungarian painter who would become one of his best friends, and such masters as László Moholy-Nagy, Oskar Kokoschka and Wassily Kandinsky. It was here, too, that Brassaï first read Goethe, whose appreciation of commonplace objects and events would shape Brassaï's approach to art. The young man's submergence in the life around him would serve him brilliantly as a photographer of people, particularly those scraping along on the edges of society and suspicious of outsiders. Henry Miller, who would nickname Brassaï "the eye of Paris," remarked on his talent for endowing ordinary objects with "attributes of the marvelous." What Miller praised was in fact the fruit of his friend's apprenticeship to Goethe—he didn't judge his subjects but sought to portray them in their own light.

The provocative, irrepressible Kiki of Montparnasse became a symbol of the quarter's nonconformity. Brassaï caught the model and singer at the Cabaret des Fleurs, c. 1932.

By the spring of 1922, runaway inflation in Germany was eating into Brassaï's income, and the time had come for him to leave. In early 1924, after an extended stay in Transylvania, Brassaï arrived in Paris and took rooms in the heart of Montparnasse. Like so many other intoxicated newcomers, he spent much of his time in artists' haunts and on the pavement, wandering from district to district, drinking in the metropolis. Shortly after Brassaï's arrival, Lajos Tihanyi wrote to a friend, "Halász is here; he came two weeks ago. He is walking in the city without direction. I am through that period, but spring makes me start again." In his own letters, Brassaï registered enthusiasm for "croissants, brioches, artichokes, extremely light meals, shop windows, [and] ravishing women."

"I stroll about the Louvre," he wrote, "stand agape before stones and people, watch the anglers by the Seine, the smokestacks as they bend their heads under the bridges, and the pigeons and parrots of the animal dealers."

Paris was not a museum to Brassaï. He was consumed by how people lived and moved in the city's public spaces. This was the life he wanted to capture, but how best to do so? The young man justified to his parents his sleeping all day, his hanging out in the cafés and his nocturnal ramblings by proclaiming, "Could I have done anything wiser in the first few months than to do nothing? . . . There is,

MUSEUM OF MODERN ART, NEW YORK

indeed, an abundance of things that demand one's attention here, particularly for a person like me, who is intrigued by every particle of this living monster, its outside, its inside, the way it breathes, lives, and moves."

When he was not initiating himself in the "living monster's" intimacies, Brassaï scrambled for assignments as a freelance writer. He established himself as a contributor to various German, French and English publications, but his income was erratic. A trip to the Riviera was supposed to pay off in articles and money, but neither materialized, and Brassaï subsisted on discarded fruit that he fished out of garbage bins until a friend sent him a check. During these years, Brassaï would later admit, he and his colleagues "manufactured fake interviews with world luminaries." Henry Miller reminisced that "each of us managed to find some odd jobs, including some rather unusual ones, such as retyping an old newspaper article and selling it to an editor as original work." When things were slow, Brassaï said, he and Miller would sit in cafés for hours, praying for someone to come along and pick up the tab.

Brassaï shot this amusing take of a pedestrian passing a statue of Napoleon outside a New Orleans antiques shop in 1957. His surrealistic *Shop Window, Paris* (right) was taken c. 1931.

These raffish irregularities were at the source of the photographer's now-famous pseudonym. In 1924, he told his parents that he was signing his articles "Gyula Brassaï" because he "had to create a separate being" responsible for the superficial opinions and trivial topics that he felt characterized his journalism. He planned to immortalize his family name by attaching "Halász" to paintings and other works of genuine artistic value, while keeping "Brassaï" for the jobs that circumstances forced him to take. But by the early 1930s he had dropped his first name, forgotten about his last and had become "Brassaï" for good.

In later life Brassaï maintained that he had initially disdained photography because he "looked upon it as something aside from true art." But the articles he turned out required illustration, and he would often call on photographers to take pictures for him. Tucker's research, as well as Brassaï's letters from the mid-1920s, reveal that in September 1924 he started gathering photographs for stories and that as early as January 1925 a network of photographers were sending him images. Brassaï, it seems, planned to master the camera himself for the purpose of providing his own pictures, but he did not actually begin to photograph until the end of 1929 because he could not afford to buy a camera. Instead, he hired others to record situations that he had set up himself, so by the time his financial position had improved, he had been thinking photographically for years. By then, however, he had lost all interest in pictures that would function solely as illustrations. Recognizing that photographs could be the most direct and comprehensive recorder of nocturnal Paris, which had mesmerized him since his earliest days in Montparnasse, he chose to create images for his own fulfillment. "I realized that photography was the *only means* by which I could achieve what I wanted," he said, "so I took it up seriously."

For months and months, Brassaï spent his nights out shooting. He was so excited by his mission that he even climbed the darkened stairs of decaying houses, knocked on apartment doors and startled strangers awake to see the view from their windows. He always said that he did not invent: he observed and selected. He did not approach his subject randomly but had fully developed ideas and themes. He often chose to photograph the great set pieces of the city—the Place de la Concorde or the bridges along the Seine. He learned that the best results were achieved in damp weather, when fog softened the harshness of electric lights. Yet their illumination bathed the deserted monuments, parks, churches, railroad stations, streets and sidewalks in a radiance that, especially in counterpoint to the patterns cast by shadows of dimly lit structures, heightened the sense of Paris as a dreamworld.

After he had about a hundred pictures, Brassaï showed them to two editors, and in November 1931 the second one

MUSEUM OF FINE ARTS, HOUSTON (2)

Etrennes Utiles

gave him a book contract. Brassaï made some additional images, and in late 1932 *Paris de nuit* was published to enormous acclaim, catapulting him onto photography's center stage. Exhibitions were offered, magazine assignments flowed in, and photographers from Bill Brandt in England to Weegee in the United States could not have done without his example.

Although the bulk of the 64 pictures in *Paris de nuit* were exterior scenes, there were also interiors containing glimpses of people who had rarely been photographed. These inhabitants of hidden and clandestine Paris were the basis of Brassaï's next exploration—the series that constitutes his boldest artistic feat. No other photographer had regarded the rituals and rogue sensuality of this fringe world as worthy of serious artistic consideration, or even of minor documentary value. That omission surprised the photographer, who felt that the underground society of prostitutes, hoodlums, ragpickers and clochards "represented Paris at its least cosmopolitan, at its most alive, its most authentic, that in these colorful faces . . . there had been preserved, from age to age, almost without alteration, the folklore of its most remote past."

Brassaï's eye was unblinking in its bluntness, illusionless in its acceptance of how life was lived, and insatiable in its desire to probe details customarily hidden from view. The photographer portrayed his subjects without pity or disapproval, which is one reason he was able to win access to a world closed to the uninitiated. His images, notes Tucker, are unposed yet composed—sometimes even staged. There was complicity between subject and artist. Brassaï had to anticipate, calculate and win the trust of people who had every reason to remain anonymous. He bought them drinks, gave them prints and, if necessary, paid them. He could not become invisible, so he led his sitters to understand that he would be photographing them, but that they wouldn't know exactly when.

Mixing with the city's worst toughs was an ominous business. Any rapport was temporary, strained and necessarily expedient. One night Brassaï's negatives were stolen; another time his camera was smashed. His wallet was lifted by the same crooks he had already paid for cooperation; once he was nearly murdered. But he endured these dangers and did not report any of the thefts to the police because, he rationalized, stealing was their profession. "Thievery for them, photographs for me," he wrote. "What they did was in character. To each his own."

Blending realism and poetry, Brassaï created memorable images of all walks of society, from a Parisian at an elegant ball (above) to a nun at the Hospital for the Poor (right).

Brassaï's pictures of the demimonde were published in 1976 as *The Secret Paris of the 30's*, accompanied by a text written by the photographer. In describing the behavior codes of the poor and the down-and-out, he savored the similarities between the underworld and the most fashionable circles of French society. "Entry into both these exclusive societies, made up primarily of the idle," he wrote, "is not easy. Each has its regulations, its customs and usages, its moral code, its affairs of honor. . . . Even the languages are similar, both tainted with snobbery." Brassaï was able to research this insight through Carmel Snow, the innovative editor of *Harper's Bazaar*. After *Paris de nuit* appeared, she hired Brassaï to cover French culture and society. With *Bazaar* as his passport, he was able to shoot palaces, parties and people that might otherwise have been out of reach. Brassaï also photographed the city by day, and these images of Paris in its waking hours, in which Brassaï wanders among balloon vendors, lovers, dogs, cats and schoolchildren, are some of the fresher pleasures of the retrospective.

Art and artists were an integral part of Brassaï's day-to-day life, and in 1932 *Le Minotaure*, a review associated with the Surrealists, invited him to photograph Picasso's sculpture, which was then largely unknown. The assignment sparked an acquaintance that would grow into a treasured friendship and provide Brassaï with entrée into the studios of the greatest artists in Europe. For *Le Minotaure* (and later, *Verve* and *Harper's Bazaar*), he photographed, among others, Bonnard, Braque, Dalí, Giacometti, Le Corbusier, Léger, Maillol and Matissse.

Brassaï set these artists in their creative milieus and avoided photographing fleeting or affected expressions by waiting until they were absorbed in their work or had lapsed into thought. He normally took two or three exposures. "I find it concentrates one more to shoot less," he told the writer Lawrence Durrell. "Of course it's chancy; when you shoot a lot you stand a better chance, but then

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you are subjecting yourself to the law of accident. . . . When I succeed . . . I feel that I have really made [the picture] myself . . . not won it in a lottery."

Brassaï's method kept him focused on essentials. In one image, Salvador Dalí and his wife, Gala, who controlled his life and art, are entwined; in another, Dalí's hallucinatory eyes sparkle and his jet-black hair gleams. The intensity so apparent in Brassaï's portraits of Matisse in his studio coalesce with the artist's words on the necessity of overcoming modesty in order to attain one's ambition. "It's not enough to have artistic talent," Matisse told him. "You also need another kind of talent to make yourself felt."

But the ruling icon in Brassaï's life was Picasso, particularly during World War II. The City of Light was blacked out every night, and Brassaï took care to document this melancholy predicament. But paper and film were in short supply, and after France fell in 1940, he had to receive authorization from the Nazis in order to work. Getting a permit would have meant agreeing to collaborate with the Germans, which he refused to do. In a Paris of rationing, curfews, propaganda, arrests and executions, those who remained endured privations together and looked to each other for courage. Picasso's resolve bolstered Brassaï's own. Because Brassaï had no magazine jobs, his money was vanishing. (At one point he was forced into hiding because, as a Romanian citizen, he was subject to conscription by the Germans. "I preferred desertion," he declared.) Picasso came to the rescue in 1943 by asking him to photograph his sculpture for an intended book. Brassaï labored in the artist's unheated studio in an overcoat, scarf and hat; the winter was so cold that Brassaï's pet fish froze in its bowl. After his sessions with Picasso, the photographer wrote up their conversations. The notes became the basis of *Picasso and Company*, a book that has become a classic. Picasso gained from these meetings, too. He respected Brassaï as an insightful analyst of his creative process. "Through your photographs," the artist said, "I can judge my sculptures. When I look at the pictures, I see the work with new 'eyes.'"

Thanks to Picasso, Brassaï's life changed in another way. In April 1945, a magazine asked Brassaï for a print of one of the sculptures. Instead of the regular messenger, the editor sent Gilberte-Mercédès Boyer, a beautiful young French woman. Brassaï showed her his photographs and drawings and, as Gilberte later said, "I never left." The two were wed in 1948, and their union lasted until his death in 1984. During that time, their small Paris apartment became increasingly crammed with all sorts of objects that Brassaï had happened on and saved. His study was a jumble of snapshots, primitive paintings, bones, dolls, masks and finds from the flea market. One photograph in this vein was of a loaf of bread shaped like a face: "It is the spitting image of French life," he contended, "optimistic in spite of it all, limited to immediate pleasures, egocentric, gourmand."

Brassaï sought out scenes that conveyed the special character or atmosphere of a place. Above: *Porter at Les Halles Market* (1935). Right: *Chartres Cathedral in Winter* (1946).

Nowhere was Brassai's statement that his "ambition was always to see an aspect of everyday life as if discovering it for the first time" more evident than in his studies of graffiti. He first noticed the markings on the walls of working-class districts of Paris when he was recording the demi-monde. He kept track of these markings and returned over the years to document their modifications. He also looked for vigorous new examples. "The wall gives its voice to that part of man which, without it, would be condemned to silence," he wrote.

Brassaï's 1961 publication of a book on graffiti marked the diminution of his interest in the still camera. He made a film about animals that won a prize at the Cannes Film Festival, and turned his attention to drawing, sculpting and especially writing. To the end, he continued to chronicle the place and the age in which he lived, "to breathe it in," and "probe it with eyes and hands."

Writer Avis Berman met Brassaï in 1983. Her interview with the photographer is included in the catalogue for the Brassaï exhibition.

NATIONAL MUSEUM OF AMERICAN HISTORY, SI; P. 99 J PAUL GETTY MUSEUM

Looking for H

SET ADRIFT BY MUTINEERS DURING HIS EXPEDITION TO FIND A NORTHWEST PASSAGE, THE FAMOUS EXPLORER WAS NEVER HEARD FROM AGAIN. WHAT WAS HIS FATE?

BY LAWRENCE MILLMAN

ILLUSTRATIONS BY GREGORY MANCHESS

enry Hudson

IT COULD BE A SCENE FROM A MOVIE—A SORT OF BOREAL *MUTINY ON THE BOUNTY*. NINE figures huddle together in an open boat. One of them, the master, has a look of numb surprise on his face. His son is at his side, perhaps to comfort him, perhaps just seeking a degree of warmth. One man is shaking his fist at unseen enemies; another is sobbing. The rest of the castaways, scurvy-sick, seem indifferent to their fate. The camera backs off to reveal, in the distance, a bark with sails unfurled. The gap between the two vessels slowly widens until the smaller one is no more than a pinprick in the immensity of ice-flecked seas. Fade out to, appropriately, white.

The fate of our marooned shipmaster—Henry Hudson—remains a mystery even now, nearly 400 years later. The usual explanation for what happened to him is that he died of hypothermia or starvation, or both, after being set adrift. Yet, I've heard stories from the area where he disappeared that suggest he may have lived for months, possibly years, after the mutiny. I've also met blue-eyed, light-skinned natives who claim Hudson as their distant ancestor. One man even identified himself as the rightful heir to the Hudson family fortune: Would I mind going to England to procure it for him?

Hudson's life before he vanished is no less a mystery than what happened to him in those icy seas. We mention his name every time we refer to a great bay, several cities and towns, a county, a strait and one of the world's most vital rivers, but we know next to nothing about his background. There's not even a reliable portrait of the man who was arguably England's most important maritime explorer before Capt. James Cook.

And yet Hudson bequeathed us a portrait of himself in the events of his four voyages. They suggest a man who was obsessed, self-absorbed, secretive, democratic, distrustful, intellectually curious and paranoid. Likewise a captain who was a brilliant navigator, but whose very presence seemed to inspire mutiny in his crews. In spite of his flaws or maybe because of them, Hudson emerges from these voyages as a remarkably human figure.

We first encounter him in 1607 as the master of the bark *Hopewell*, preparing to launch an expedition in search of a route to the legendary riches of the Orient by way of the North Pole. (The pole's five months

of sunlight blessed it with a warm climate, according to contemporary wisdom.) Scouring the Arctic from Greenland to Spitsbergen, he reached beyond 80 degrees north latitude, the farthest north anyone would sail for more than 100 years. His progress was finally frustrated by sea ice—not exactly a warm-climate phenomenon.

The following year Hudson sailed under the same sponsor, the English Muscovy Company, and this time tried to reach Asia via the Arctic coast of Russia. Sailing to the north of Scandinavia and into the Barents Sea, he got as far as Novaya Zemlya and was in search of a strait to the Kara Sea when ice again stopped him, so he turned his ship around to look for a western passage. Whereupon his crew staged what might be called a "soft" mutiny; perhaps they were homesick, perhaps simply sick of the intemperate North. Their compliant leader turned his ship around again and headed back to England.

In 1609, we find him attempting the same northeastern route in the employ of the Dutch. Heavy ice near Novaya Zemlya again appears to have brought out his crew's mutinous instincts. Another captain might have stuck to his guns, but Hudson gave in once more.

A trading session turned nasty. Greene, Wilson and at least two others were killed in the melee.

So now he set his course on a more southwesterly route, much to the delight of his fair-weather crew. He sailed his ship the *Half Moon* across the Atlantic, along the Eastern Seaboard of America, and into New York Harbor, from which he began navigating the river that would later bear his name. Along the way he met a number of Delaware and Mohican Indians, and at one point threw a party for several of their leaders; his guests got so drunk that their descendants were still talking about it 200 years later.

He would travel as far as the present site of Albany before concluding that upstate New York was not the gateway to China. But his voyage was not a failure, at least not for his employers, who would claim the Hudson River Valley for the Dutch.

Back home Hudson was criticized for selling his services to a rival power, although not for long. He was England's most experienced Arctic hand at a time when England was looking for the shortest route to the putative riches of the East; and the shortest route, for such a relatively high latitude country, would be across the Arctic . . . *west* across the Arctic, Hudson himself now believed. So a syndicate of wealthy Englishmen

headed by Sir Thomas Smith, Sir Dudley Digges and Master John Wolstenholme now gave him command of what must have been the most lavishly funded single-ship expedition of its day, telling him, in effect, "Go find the Northwest Passage."

On April 17, 1610, Hudson and 22 men sailed the 55-ton bluff-bowed bark *Discovery* out of Saint Katharines Pool on his fourth voyage of exploration. This one would make the previous voyages seem like Sunday school picnics.

This was not the South Seas or the Spice Islands; it was the cruel subarctic of North America. Hudson's crew hardly knew what to expect from the coming winter.

TWENTY MILES DOWN THE THAMES, he touched at Gravesend and picked up a young protégé of his named Henry Greene. Greene was a wastrel, a libertine and an all-around rogue—a peculiar addition to the crew. Robert Juet, the mate, believed Greene had been shipped aboard to spy on the others. This may have been true: a good spy can nip mutiny in the bud.

The *Discovery*'s crew was certainly no worse than the usual ragtag-and-bobtail crews of the day. It included the sharp-tongued but seemingly reliable Juet; carpenter Philip Staffe, steadfast as his name; Abacuk Prickett, a London haberdasher and Sir Dudley's servant; a rough but honest salt named John King; Robert Bylot, an able seaman; a young scholar, Thomas Wydowse, who'd signed on as a passenger; and Hudson's son John.

A motley group, yes, but hardly a devil's brew.

Hudson sailed up the east coast of Britain to Iceland, then steered a course past Greenland to the "Furious Overfall" at the entry to Hudson Strait. The strength of this tidal flow, described a generation earlier by Capt. John Davis, suggested a possible entrance to the long-sought Northwest Passage. Armadas of racing ice now buffeted the *Discovery* like a cockleshell, forcing Hudson to alter his course repeatedly. At last he took his ship south to Ungava Bay, where it got stuck in a crazy quilt of ice. The crew began to grumble.

Anyone who has ever been stuck in sea ice can sympathize with them; you feel like you might be stuck there for all eternity.

Hudson's crew couldn't go anywhere, so they couldn't act on their grumbling. Little by little they worked the *Discovery* into open water. Hudson now set his course to the northwest. On August 3, he groped his way between two scoured, massive headlands (he named them, not surprisingly, Cape Digges and Cape Wolstenholme) and entered the vast reservoir of Hudson Bay.

Abacuk Prickett, who wrote the only surviving eyewitness account of the entire trip (a fragment of Hudson's journal survives), was not impressed with the local scenery. An island in the strait was "a most barren place, having nothing on it but plashes of water and riven rockes, as it were subject to earthquakes," he remarked in his journal.

But Hudson himself must have been pleased, at least initially. Having just passed through a strait longer than the Strait of Magellan, he probably thought that he had won the passage. But as his ship moved southward along the desolate shoreline of Hudson Bay, he may have felt that he'd won only a booby prize.

By September, he had entered the bay's southern pocket, now known as James Bay. James Bay is swampy, mucky and wind-whipped. It's so shallow that you can be a quarter-mile out from land and still touch bottom with a paddle.

Hudson's already frayed nerves seemed to snap, and he took out his frustration on his crew. So when Juet mocked his belief that they would be

in Java by Candlemas (February 2), he flew into a rage and condemned Juet's "abuses and slanders" as mutinous behavior. The mate was stripped of his rank and replaced by Robert Bylot. Boatswain Francis Clements was deposed on similar charges and replaced by a ruffian named William Wilson.

Obviously, Hudson was a man with mutiny on his mind. Back and forth, back and forth, he zigzagged between the low, gaunt shores of James Bay. Each zigzag took him later into the season, reducing his chances of catching a south wind that might have liberated him from what Prickett refers to as a "labyrinth without end."

The first winter storms came and went, and still he continued his seemingly futile wanderings. At one point, he put his ship on the rocks—not a blunder you'd expect from a competent navigator. At another point, he managed to lose one of the ship's anchors. One day some of his crew went ashore and discovered human footprints etched in the snow. They may have found in these solitary prints a representation of their own increasingly unhappy state; they were mired in the cold themselves, and with a captain who seemed not only to have lost his way, but his marbles as well.

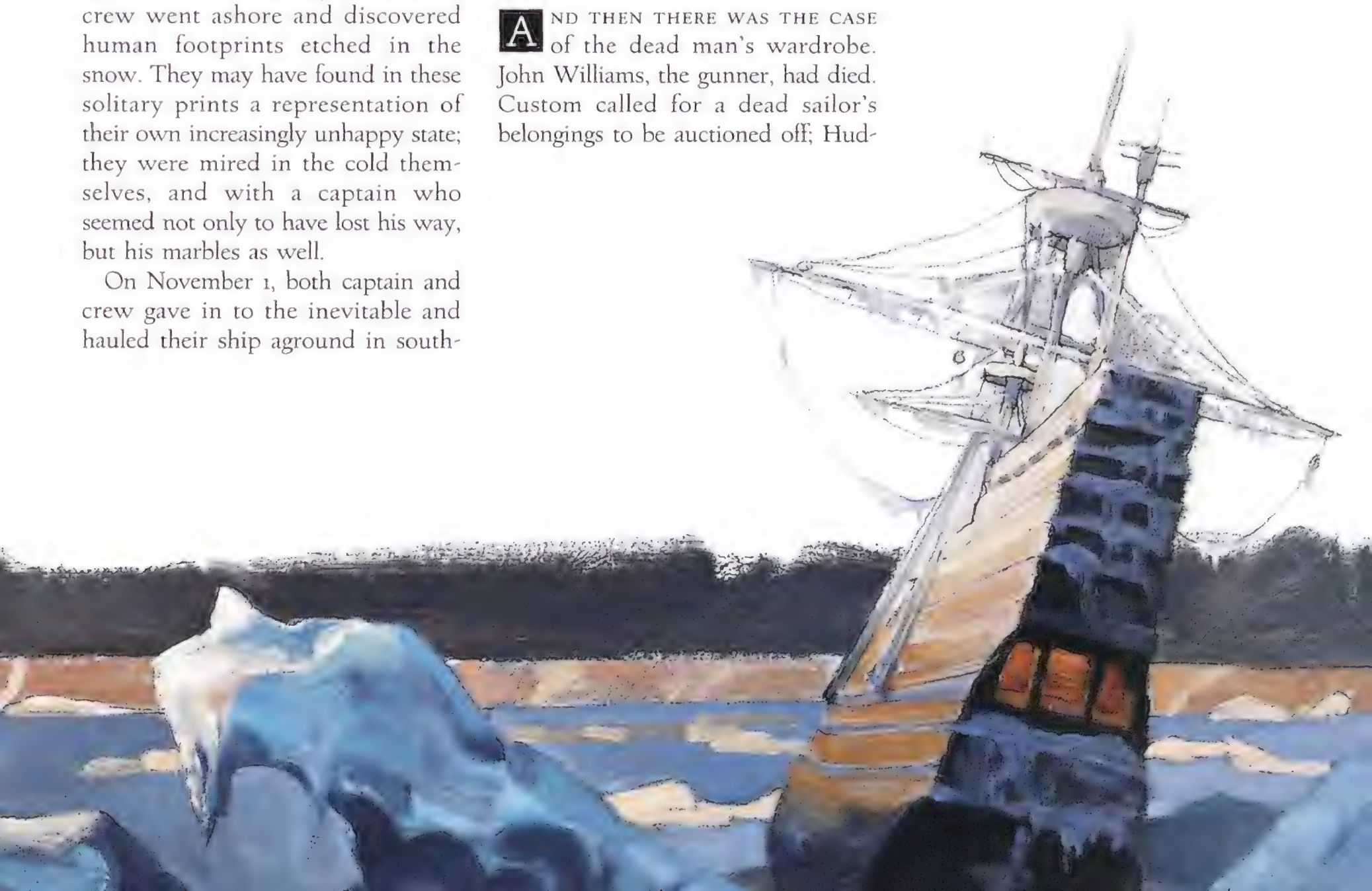
On November 1, both captain and crew gave in to the inevitable and hauled their ship aground in southeastern James Bay. By the 10th the *Discovery* was frozen in for the winter.

This was not the south seas or the Spice Islands. It was the cruel subarctic of North America, and Hudson's crew hardly knew what to expect from the coming winter. Maybe they had heard stories about Sir Hugh Willoughby's men caught in the ice in Arctic Russia nearly 60 years earlier and being frozen like statues. With their inadequate clothing, they may have wondered if they would end up that way, too.

Almost immediately, there was trouble. Hudson ordered the carpenter to build a house onshore. Staffe told him that it was too late in the year to begin a construction project: there was snow on the ground, the ground itself was frozen. Hudson lost his temper and threatened to have Staffe, one of his most loyal crewmen, hung. Grumbling, Staffe built the house.

AND THEN THERE WAS THE CASE of the dead man's wardrobe. John Williams, the gunner, had died. Custom called for a dead sailor's belongings to be auctioned off; Hudson violated this custom by giving Williams' "gray cloth gowne" to Henry Greene. When Greene went hunting with the recently maligned Staffe, Hudson took back the garment and offered it to Robert Bylot. And when Greene protested, Hudson gave him a violent tongue-lashing.

"To speake of all our trouble in this time of winter . . . ," writes Prickett, "would bee too tedious." He adds that the cold "lamed" most of the crew, including himself. Actually, what lamed them was not the cold but scurvy. With limbs swollen and barely functional, with pulpy gums and unhealing wounds, they must have looked a sorry sight; and when hunger forced them to emulate caribou and paw the snow for "moss of the ground," they must have looked an even sorrier sight. As it happened, the lichen turned out to be more or less inedible.



Toward spring they had a visitor—a native curious about these pitiful strangers. Hudson gave the man, among other trinkets, a mirror. The next day he returned, pulling a sled laden with skins. He wanted to barter a deer skin for a hatchet, but Hudson indicated that a hatchet was worth two skins. The man could tell a squeeze when he saw one, and although he agreed to the trade, he never came back. This meeting inaugurated the fur trade in James Bay, a trade that would begin in earnest some 60 years later with the arrival of the Hudson's Bay Company.

THE NATIVE MUST HAVE PASSED along an account of the meeting to his people, for the pale-skinned outsiders entered the oral lore of the James Bay Cree. Many years later, Andrew Graham (c. 1733-1815), the Hudson's Bay Company's chief factor, wrote that a group of Cree called the Oupeeshepow were still telling stories about "the arrival and wintering of the unfortunate Captain Henry Hudson, as handed down to them by the tradition of their ancestors."

Prickett's journal is vague about where this singularly unpleasant wintering took place. In 1668 a Boston captain named Zachariah Gillam sailed his ketch *Nonsuch* into Rupert Bay and found "the ruins of a house which had been built there above 60 Yeares before by the English." If this house was in fact Staffe's (the time frame is right), then Hudson and his men spent the winter near the mouth of the Rupert River, very near where the present-day Cree community of Waskaganish is located.

With the ice retreating from shore, Hudson weighed anchor in mid-June and sailed to the northwest. A short while later, he deposed Robert Bylot as mate and replaced him with a man who could neither read nor write. The rest of the crew were appalled.

Shortly after daybreak that fateful June morning in 1611, Henry Hudson stepped out of his cabin. He was grabbed instantly and his arms bound.

Since Hudson had already forbidden any of them to keep an account of the *Discovery*'s position, they now felt that, in Prickett's words, "the master and his ignorant mate would take the ship whither the master pleased."

And "whither the master pleased" would appear to be a continued search for the passage. Hudson knew his crew had had enough of northern travel, but he seems to have thought they would behave themselves if he was the only man on board capable of bringing the ship home to England. He was mistaken.

Tongues wag on a ship, especially on a ship whose larder is almost empty. Somehow word got out that Hudson had a private reserve of food for himself and his so-called favorites. William Wilson asked Staffe about this, and the carpenter replied that certain members of the crew needed to be "kept up." Wilson must have wondered what would happen to those who weren't being kept up, those subsisting on meager rations like himself.

You can envision a scene in the *Discovery*'s smoky, ill-lit forecastle: a group of hungry, disgruntled men are lying in their bunks; they curse this master with salty expressions; and while they're at it, they curse the ice, the cold, the winds, indeed the whole damned North. If they ever want to see their homes in England again, there's only one thing to do . . .

With the ship trapped in pack ice, Wilson and Henry Greene crept into Prickett's cabin, told him of their plan to take over the ship and solicited his support. Prickett tried to dissuade them from doing "such an evil thing in the sight of God and man," or so he says (his journal can be read as a brief on behalf of his own innocence). Greene cut him short: he knew mutiny was a hangable offense but said he would rather be hanged at home than starved abroad.

The turncoat Greene was the plot's instigator, but he had the support of at least half the crew, including Juet, Clements and even the cook. As eager as Prickett may have been to save Hudson's skin, he was considerably more eager to save his own, and he joined them.

Shortly after daybreak on that fateful June morning in 1611, Henry Hudson stepped out of his cabin. He was grabbed instantly and his arms were bound. While he was struggling with his captors, the mutineers rounded up his favorites—his son John, the passenger Wydowse (what a lousy vacation this was turning out to be!) and quartermaster John King. Then "the poore, sicke, and lame men" were herded out of their cabins and bundled into the ship's shallop with Hudson and the others. This last action seems to have been a form of triage: there was no point in wasting precious food on men already at death's door.

There remained Staffe. The mutineers needed his carpentry skills for the long journey home, but he wanted no part of them or their mutiny, so he elected to join Hudson in the shallop. This display of conscience must have touched the mutineers, because they gave Staffe his chest, along with a gun, powder and shot, some meal and a pot. Then they cut loose the craft.

To have attacked the Arctic four times with such high-minded goals and now *this*—we can only guess how Hudson must have felt as he

watched the *Discovery*'s masts sink below the horizon.

For the moment, however, let us leave him in the shallop and return to the mutineers. Their journey home was one of attrition. At Cape Digges, a trading session with the local inhabitants (bells and Jew's harps for venison) suddenly turned nasty. According to Prickett, the unarmed mutineers were set upon by natives with knives as they demonstrated their trinkets. As the sailors ran for their boat, the natives "betooke them to their bows and arrows, which they sent amongst us." Greene, Wilson and at least two others were killed in the melee. Then Juet starved to death during a haphazard Atlantic crossing; the others survived by eating marrow from bird bones fried in candle wax. A mere handful made it back to England, and those more dead than alive.

The survivors blamed the mutiny on their conveniently dead shipmates. But what probably saved them from the gallows was their claim that they had located the elusive Northwest Passage. This may have been a ruse, or they may have actually believed that the capacious bay from which they had so recently escaped had an outlet to the Pacific. In any event, you don't hang a potential economic windfall.

Legal proceedings against the mutineers were suspended while the *Dis-*

covery returned to Hudson Bay not once, but twice, to search for the passage. That neither of these expeditions found it didn't discourage the seekers; 150 years later, die-hard believers were still poking around the cul-de-sac of Hudson Bay in search of some sort of thoroughfare to the East.

In 1618, four of the mutineers were at last brought before the High Court of Admiralty. They were tried not for mutiny but for murder. The court dismissed charges against two and declared the others not guilty. It's hard to see their trial as anything other than a formality, particularly in light of the fact that Prickett and Bylot had become members in good standing of a new commercial venture dedicated to finding the passage.

But what of the castaways themselves? Caught up in the passage craze, Hudson's sponsors made virtually no effort to find him. Later travelers to Hudson Bay brought back stories about wooden stakes carved by white man's tools and English scalps decorating native wigwams. But such stories were inconclusive. Thus the nearly universal verdict: Hudson and his men died of cold and exposure after being set adrift.

Hudson possessed a tenacity that, in another era, might have put him on a lofty Himalayan summit or at one of the poles. Also, he wasn't bundled into a mere dinghy.

BUT MEN WHO'D SURVIVED AN entire subarctic winter might well have survived a while longer during the subarctic spring. Hudson himself possessed a tenacity that, in another era, might have put the explorer on a lofty Himalayan summit or at one of the poles. Also, he wasn't bundled into a mere dinghy. A typical shallop of his day (*chaloupe en fagot*, as the French called it, referring to the way it was stored in pieces on a ship) might have been as long as 30 feet, and could have had at least one halfdeck and one or more masts.

Such a boat might have managed the open sea without too much difficulty. In fact, it's been proposed that Hudson sailed the shallop out of the bay and all the way across the North Atlantic to, of all places, Spitsbergen. This theory is based on a frozen corpse reputedly exhumed during an 1823 Spitsbergen expedition and somehow identified as Hudson's mortal remains. But it seems more likely that the corpse belonged to one of the many whalers buried in Spitsbergen, since it's rather improbable that a navigator of Hudson's ability would have missed England by more than 1,500 miles.

Prickett's account is maddeningly vague on geographic detail, and the exact location of the mutiny is unknown; several historians have placed it somewhere in the vicinity of Charlton Island. If this was the case, apart from Charlton Island itself, which still might have been surrounded by pack ice, the nearest landfall for Hudson would have been the eastern shore of James Bay, perhaps 20 to 30 miles away, or one of the many rock-ribbed islands between Charlton and the mainland.

But the nearest landfall might not have been the easiest or even the most likely one.

The current in James Bay is northeastward-tending. Even today, despite the alteration of flow rates into the bay by Hydro-Québec's massive river replumbing scheme, in some places you can see the current's froth line zigzagging inexorably northward like a strand of runaway stitching.

The exact date of the mutiny is hard to pin down. It might have been June 21, 1611, or June 22 or 23. I contacted the Canadian Hydrographic Service and asked them to run their tidal prediction software and check out the tide for Charlton Island on those mornings. They converted the Julian calendar mutiny dates to the Gregorian equivalents to accommodate the program, and sent the tidal charts. So far as I can determine, the mutiny took place just as the tide was ebbing. With an ebb tide that had a northeasterly flow to it, Hudson would have read the writing on the water (so to speak) and ferried the shallop accordingly.

The trip would have been, if not a piece of cake, at least not overwhelmingly arduous. The mutineers had towed the shallop to open water before setting it adrift, but there still might have been enough ice around to act as a shock absorber on waves. Likewise the southwesterly winds that predominate in James Bay at that time of year could have assisted the shallop in a northeasterly course.

Of course, all this is conjecture. There might have been a storm blowing from the north on the morning of the mutiny; Prickett's journal could be unreliable; and the shallop itself could even have been downright unseaworthy. But that's what makes the Hudson story so interesting: there are so many question marks, so many "what ifs," "probablys" and "could have beens" that everyone becomes his own sleuth.

Now, let's go back to our movie. Huddling together in the boat, the castaways notice the current turning toward shore. Soon they find themselves entering a large bay littered with islands—islands whose rocky eminences seem to be painted a soft, beguiling red. Fade out again.

This is the Paint Hills area of James Bay, and for a generation or two, stories have been collected from the local

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BUT SHOULD EVERYBODY

RECEIVE THE *same* FINANCIAL ADVICE?

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Cree about a boatload of white men who fetched up on these shores a long time ago. That these stories are more or less fragmentary is not surprising: time can have a corrosive effect even on something so apparently immutable as an oral tradition.

The men in the boat (say the stories) were not in very good shape. Their leader may have been thrown in the water. One or two died just before or not long after the boat reached land. None of them were in any condition to travel, so they remained in the Paint Hills area and recuperated. The leader, it is curiously remembered, had red hair.

I had learned Henry Hudson stories from outsiders who had lived or worked in the James Bay area as well. Ronald Craven, an Arctic pilot who flew there in the 1950s and '60s, tells of hearing that Hudson sailed back to the place where he'd spent the winter on the assumption that that was where a rescue ship would go to look for him. Hudson may have been so confident that such a ship would come that he didn't try to make the undeniably risky trip home himself.

No rescue ship came, of course, and Hudson and his fellow maroons were obliged to spend a second winter in James Bay. The following spring, according to this version of things, they set off inland for French Canada in the company of Cree guides, but neither the guides nor Hudson was ever heard from again.

THERE IS A PLACE IN THE PAINT Hills area called Waamistikushiish. This centipede of a word means "young Englishman" in Cree. Elders in the community of Wemindji told me that a young Englishman was buried there. Or so the previous generation of elders had told them. He was thought to be Hudson's son. There was even a rumor that Henry Hudson himself might be buried in the grave.

A bear skull had been tied to the branches of a tree—a time-honored gesture of respect to the slain bear's spirit.

The prospect of a Hudson grave—*any* Hudson grave—filled me with excitement, even though none of my informants seemed to know how or when the person in the grave had died. A bona fide grave might shed some light on the mystery of what happened to at least one of the Hudsons after the mutiny.

So, with a pair of guides from Wemindji, I traveled to the peninsula near the northwestern edge of Paint Hills Bay where the Waamistikushiish site was said to be located. At the place where we hauled ashore our canoe, a seemingly endless rubble of rocks led up to an elevated terrace. Four hundred years ago this terrace would have been at sea level, so we began our search for the grave in the open lichen-woodland forest immediately behind it.

The site's ground cover was the fruticose lichen *Cladina rangiferina*, otherwise known as reindeer moss. At times this spongy silver-gray lichen would assume the shape of an impassive head, or an entire gallery of impassive heads, and at other times a burial mound. More than once, in fact, I found myself approaching what I thought might be John Hudson's grave, only to realize that it was simply a mound of lichen.

Scattered around the area were the fireplaces and collapsed *miichiwahp* (tepee) poles of old Cree campsites. Near one of them, a bear skull had been tied to the branches of a tree—a time-honored gesture of respect to the slain bear's spirit.

If this had been a movie, we might have found a grave site. But it wasn't a movie, and all we found during the next few days was a relatively recent tobacco tin, some spent shotgun shells and another bear skull. Finally, we gave up. The site was too overgrown, the pickings too slim and the mosquitoes too voracious.

Yet as we left the site, I couldn't help wondering if there was a 17th-century grave back there somewhere. But then again, maybe the stories weren't altogether accurate. Maybe John Hudson hadn't been buried there at all. Maybe he'd stayed in the area and eventually learned to survive. And maybe his father had lived to a ripe old age, a doting paterfamilias surrounded by his progeny. Or perhaps he'd starved to death while waiting for the ship that never came.

The answer to this mystery lies buried somewhere in the great silent North that obsessed Henry Hudson . . . and that at some point claimed his life as part of its own.

Lawrence Millman wrote about an Arctic murder case in the May 1998 SMITHSONIAN. *Gregory Manchess won the 1999 Hamilton King Award from the Society of Illustrators.*

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A horned, hairy Satan munches tormented sinners in Hell in this detail from Fra Angelico's *The Last Judgment* (c. 1430-33).

BY ROBERT WERNICK

WHO THE DEVIL IS THE Devil?

WITH THE RAPID APPROACH OF THE THIRD MILLENnium, many people can't help wondering what role the Devil will be playing in it. But a cursory examination of the mainstream press of America reveals almost no mention of him, and even using the Internet services that promise to keep track of everything, it's much easier to find information on Monica Lewinsky than on the Devil.

What a humiliating comedown for one the mere mention of whose name was once enough to make the hair of kings stand up in terror; of whom Saint Augustine said, "The human race is the Devil's fruit tree, his own property, from which he may pick his fruit."

To appreciate the full extent of that downfall, try to put yourself someplace in Western Europe in the year 999, as the second millennium was about to bow in.

In the tenth century and for at least half a millennium thereafter, the Devil was everywhere. He leered out of every church door, he capered through castle and church and cottage, and his plots and pranks and temptings of humans were spelled out in sermons, on the stage, in paintings, in pious books, and in stories told in taverns or in homes at bedtime.

No corner or cranny of daily life escaped him. He lurked outside every orifice of the human body, waiting for the chance to get at the human soul inside—one reason why to this day we say "God bless you" when we hear someone sneeze.

The Devil fathered children on sleeping women, he stirred up conspiracies and treasons, he led travelers astray. He caused boils, plagues, tempests, shipwrecks, heresies, barbarian invasions. Whatever he did, his name was on everyone's tongue, and he went by many names: Satan,

Damned souls writhe as a grinning Devil looks on in *An Angel Locks the Gates of Hell*, from the Winchester Psalter (1150).

Lucifer, Beelzebub, Belial, Mastema, the Prince of Darkness, the Lord of Lies. In the Bible he was the Accuser, the Evil One, the Prince of this World.

Today, a few scant hundred years later, he has dropped so far out of sight that some believe he is gone for good. It may be true that 48 percent of Americans tell the pollsters they believe in the existence of the Devil and another 20 percent find his existence probable. But though they use him often enough in common lighthearted expressions (give the devil his due, the devil is in the details) and in the privacy of their hearts may put the blame on him when they covet their neighbor's wife or cheat on their income tax, they do very little talking about him out loud. Reported physical appearances of the Devil are far rarer than sightings of UFOs. In practical terms, people have banished him from public life.

Yet most everyone who discusses moral standards in pulpits or on television talk shows or in the *New York Times* is agreed that morals are lower than ever before. The Devil should be out in the streets and on the airwaves, roaring like a lion about his triumphs. Where has he gone? It all depends on precisely what you mean by "the Devil."

Theologians have been arguing for centuries (and sometimes have gone to the stake for expressing the wrong opinion) to achieve a satisfactory definition. But today the average person with no theological axe to grind is apt to envisage the Devil as a sleek, dark-complexioned male figure, with black chin-whiskers, little horns and cloven hooves, perhaps with a foxy glint in his eye and a trace of a foreign accent, but on the whole handsome, worldly-wise, a persuasive talker, a friendly sort of customer. He may tell you anything, try to talk you into something too good to be true. Only later, when you've taken that risky bet or signed the shady contract, and he comes to collect his due, do you realize you have signed away your immortal soul. He is unquestionably the Lord of Lies.

This suave, sardonic Devil is actually a new kid on the block; he has been around for barely a few hundred years, a mere stutter in the long swell of human misery and woe. And the Devil in general, the Devil with a capital *D*, as opposed to the legions of lowercase devils, demons, imps, satyrs, fiends and so on, first entered human history less than 3,000 years ago.

But humans indistinguishable from us have been around for many thousands of years, and it seems fair to assume that from the very beginning they were all aware of unseen powerful presences affecting their lives and everything around them. Every ancient religion that we know of, as well as many modern religions with hundreds of millions of followers, perceives a bewildering array of such spirits: gods, demigods, angels, devils, demons, sprites, imps, goblins, ghosts, fairies, fauns, nymphs, jinns, poltergeists. Some of them are benevolent, some are malignant, though most of them alternate between the two extremes.

This suave, sardonic Devil is actually a new kid on the block.

The gods of ancient Greece are typical: Zeus was a wise ruler up on Mount Olympus, but he became a serial rapist when he came down to the lowlands; Persephone was goddess of life in spring and goddess of death in autumn. None of these ancient religions ever developed a single Devil concentrating all the essence of evil, any more than they ever concentrated the essence of good in a single God.

The Old Testament, which was composed between the tenth and the third centuries B.C., has little trace of the Devil with a capital *D*, and in its earlier books, none at all. God, speaking through the mouth of the prophet Isaiah, says, "I form the light and create darkness, I make peace and create evil, I the LORD do all these things." The serpent who tempted Adam and Eve in the Garden of Eden was later identified by Jewish rabbis and Christian church fathers with the Devil, the principle of Evil; but in the

In Hans Memling's 15th-century triptych, *The Last Judgment*, a panel depicts assorted dreadful demons tormenting the damned.

PP. 112-114 E.T. ARCHIVE; P. 115 ERICH LESSING/ART RESOURCE

A satyr leers at a nymph in the Hall of Amor and Psyche by Giulio Romano, in a 16th-century palazzo in Mantua, Italy.

third chapter of Genesis as written, he is only a snake. It took another few hundred years before both snake and Devil were identified with Lucifer ("light-bearer," the Latin translation of the Hebrew and Greek words for the morning star, the planet Venus) who in Isaiah is thrown down from Heaven for having presumed to set his throne high above the stars of God.

Ancient Hebrew had a noun, *satan*, meaning "obstructor" or "accuser," and several satans appear in the Old Testament being sent by God on different errands, such as blocking the path of Balaam's ass or giving King Saul a fit of depression. When the Old Testament was translated into Greek beginning in the third century B.C., *satan* was rendered *diabolos*, "adversary," from which come the Latin *diabolus*, French *diable*, German *Teufel*, English "devil." The first time the word appears with a capital *S*, defining a particular person, is in the Book of Job, where Satan is a sort of celestial J. Edgar Hoover, sent by the Lord to check up on the loyalty of the folks down on earth.

The first Devil, the first concentration of all evil in a single personal form, appears in history some time before the sixth century B.C., in Persia. His name is Ahriman, described by the prophet Zoroaster (Zarathustra) as the Principle of Darkness (evil) engaged in ceaseless conflict for control of the world with Ormazd or Mazda, the Principle of Light (good).

The Jews were under Persian domination for almost two centuries, and it is likely that Ahriman had some influence on the formation of the figure of their Satan. He appears for the first time acting independently in the third-century Book of Chronicles, where the text of the much older Book of Samuel is changed from "The LORD incited David," to read "Satan incited David." In the next few centuries of the so-called Intertestamentary Period between the compilation of the Old and New Testaments, when a major subject of theological speculation and literature was the apocalypse—the final struggle between good and evil at the imminent end of the world—this Satan grew in stature as the leader and embodiment of the forces of evil. The Jewish rabbis soon lost interest in him, and though he runs wild through folklore, he is a very minor figure in modern Judaism. He would be a major figure, however, as the Satan or Lucifer of the Christians or the Iblis or Shaytan of the Muslims. Whatever he does, and however powerful he may be at times, none of these religions have ever followed Zoroaster in allowing the Devil an independent existence apart from God. He is always separate but far from equal, though exactly to what extent separate and unequal has been the subject of perpetual debate on the questions that the postulation of a Devil naturally calls up: Why did a good God create an evil Devil in the first place? And if he had to, why did he give him so much power and let him reign so long? Or, as Friday asked Robinson Crusoe, "If God much strong, much might as the Devil, why God no kill the devil, no make him no more do wicked?" Such questions were being debated in Latin by 12th-century scholars in Paris in almost the same terms as by 12th-century scholars in Baghdad, and they are still being debated by scholars all over the world today.

Satan was once an angel who had led a rebellion in Heaven.

The Christian Devil, who is the one most familiar in today's literature and art, appears often, but with only sketchy details, in the New Testament. It took three or four centuries of debate and speculation for the church to settle on a unified but not quite consistent picture of his history and functions. He was once an angel—some said the firstborn and chief of all the angels—who had led a rebellion in Heaven (some said out of pride; some said out of envy either of God himself or of the man, Adam, created in God's image; some said out of sexual lust for pretty women) and had been cast down to Hell (some said on the very first day or hour of the creation of the world, others after the creation of Adam, others after the Fall of Man, others during the time of Noah), had tempted humankind

ERICH LESSING/ART RESOURCE

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into sin, which allowed him to rule the world until the coming of Christ (or until the Second Coming), and would on the Day of Judgment be condemned to perpetual torment along with all the sinners of the race of Adam.

At the beginning there was curiously little interest in the particular features of this Devil, who does not appear at all in the first six or seven centuries of Christian art. Perhaps the early Christians, members of a small persecuted sect faced with the daily possibility of meeting the representatives of the Roman state in the form of gladiators, lions and howling mobs in arenas, did not need to dream up faces for the Devil. After Christianity became the state religion of Rome in the early fourth century, the fight against the enemy changed in character. The heroes were not martyrs in an arena; they were monks who went out into the deserts to meet Satan face-to-face. Satan appeared to all of them to tempt them, and it was then that Satan first acquired a recognizable physical form, appearing variously as lion, bear, leopard, bull, serpent, hyena, scorpion and wolf.

Raphael's St. *Michael and the Devil* (1518) pictured Satan in human rather than animal form.

Still, for hundreds of years no one thought of putting an image of the Devil on paper or a church wall. There is a sixth-century manuscript of the Gospels in Syriac that shows a couple of little black-winged creatures fleeing from the mouth of a man being exorcized. Not till the ninth century, in an illustrated manuscript known as the *Utrecht Psalter*, does a recognizable Devil appear, as a half-naked man holding a three-pronged pitchfork. The Devil would appear often like this in the next couple of centuries, human or at least humanoid in form, sometimes wearing the halo of his old angelic days in Heaven.

Around the tenth century, the Devil began to assume monstrous forms.

Then, some time around the pre-millennial tenth century, the Devil began, all over the Western world, to assume monstrous forms. He appeared on the illustrated pages of books now written for the first time in the vernacular languages, and on the painted walls and ceilings and the carved doors and columns and waterspouts of churches and cathedrals. Everywhere there were scenes from sacred history intended to teach the illiterate masses the way to salvation, and the Devil played a prominent, sometimes predominant, role in these scenes.

He appeared in a thousand grotesque and horrible guises. His features might be derived from those of old gods of Greece and Rome whose broken images still cluttered the soil of Europe, or the newer gods of the barbarian Germans and Scandinavians, or more ancient supernatural beings from Mesopotamia, Egypt, Persia, even China, who spread their wings on imported silks and tapestries. He borrowed horns and hairy legs with cloven hooves from the Greek god Pan, a hooked nose and grimacing lips from the Etruscan death god Charun, a pitchfork from the Roman sea god Neptune, an animal head from the Egyptian god Anubis. Sometimes he was a furry black monkey with great black bat's wings. Sometimes he was a snake, a wolf, a frog, a bear, a mouse, an owl, a raven, a tortoise, a worm. Often he appeared as a combination of human and animal forms, with a tail, spiky flamelike hair, an apish body, a goat's hairy thighs, an ass's feet, a boar's tusks, a wolfish mouth, an eagle's claws, a monkey's paws, a lizard's skin, a snake's tongue. When he led the revolt of the angels in Heaven, fighting Saint Michael, he was a scaly dragon. Enthroned in Hell, he was a potbellied imbecilic old man, with snakes growing out of his head and limbs, mindlessly chewing on the sterile souls of naked sinners as they dropped down to him on Judgment Day.

He was meant to be both frightening and disgusting, to demonstrate both the horror and the folly of sin. The fright was all the greater because the devices like bone-vices, spine-rollers and red-hot prongs being used to torture sinners down in Hell were copied from those being used to torture heretics in public up on earth.

The static visions on the church walls were regularly brought to life in plays staged in front of churches or in public squares. Surrounded by elaborate scenery and firecrackers, the Devil was always a popular performer when, clothed in snakeskin and with a woman's face, he dangled an apple before our First Parents in Eden, or with fanged mask and hairy goat's body, he grimaced and grunted and growled as he prodded wailing sinners into a Mouth of Hell that could open and shut and spit flames.

SCALA/ART RESOURCE

In his 1505 version of St. Michael and the Devil, Raphael depicted the embodiment of Evil as a dragon defeated by Good.

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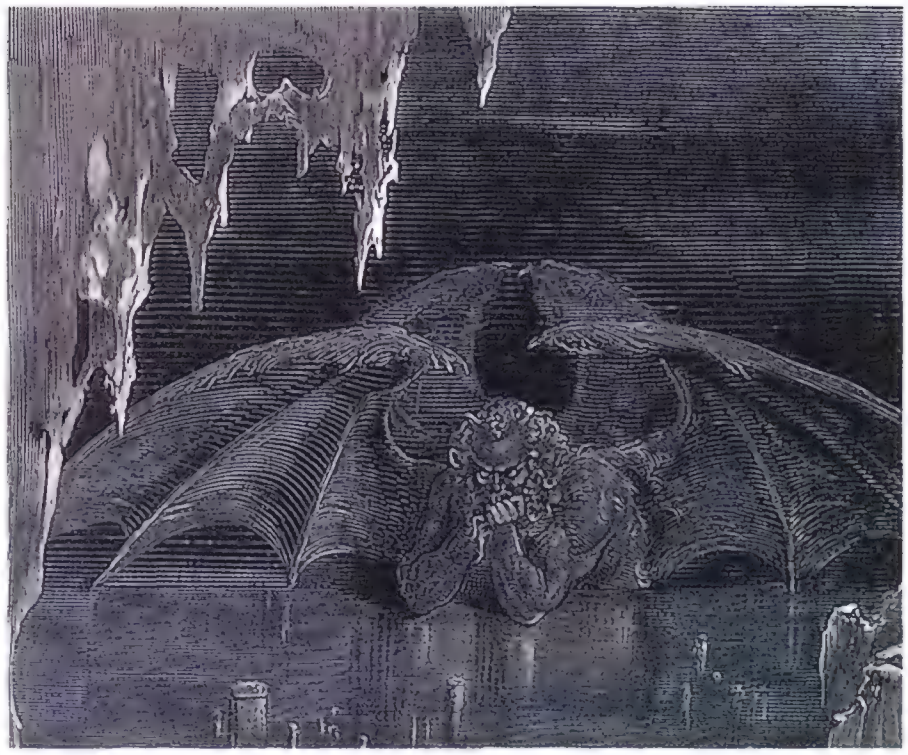
One of the most popular stories throughout the Middle Ages, retold hundreds of times in many European languages, was that of Theophilus of Cilicia, a sixth-century ecclesiastic who signed a pact with the Devil, exchanging his soul for a powerful and profitable position in the church. He was then able to lead a life of unbridled pride and corruption till one day the Devil reappeared and demanded his payment. In terror, Theophilus repented and threw himself on the mercy of the Virgin Mary, who took pity on him, descended into Hell, grabbed the pact from Satan, then interceded for the sinner at the throne of God. He was pardoned, and the Devil was cheated of his due.

This tale played a major role in establishing the cult of the Virgin in Catholic Europe. It had the subsidiary effect of familiarizing everyone with the idea of diabolical pacts. The authorities of church and state took advantage of this when sometime in the 15th century they claimed to discover a vast conspiracy by a confederation of witches dedicated to the subversion of all order. There were, of course, plenty of supposed witches around, mostly old countrywomen who



A bat-winged Satan broods in the frozen lowest circle of Hell in Gustave Doré's 19th-century illustration for Dante's *Inferno*.

knew the traditional herbs and chants and charms that would attract a handsome lover or stop an unwanted pregnancy or blast the crops in an unfriendly neighbor's field. But for the space of two or three centuries, tens of thousands of accused witches, most of them women, most of them poor illiterates, were hanged or burned after being forced to confess to taking part in secret midnight meetings at which they ate babies, copulated with the Devil and signed blood compacts with him.

The Salem witch trials of 1692 are the most familiar to Americans, having left an indelible stain on the name of our Puritan forebears. Perhaps the most interesting thing about them is that, compared with what had been going on in Europe for the previous three centuries, they were on such a very small scale: 18 women, one man and two dogs put to death in obedience to the biblical command "Thou shalt not suffer a witch to live." And there were no more witch trials in the Colonies after Salem.

For by the year 1700 few educated people really believed in witches anymore, and increasingly they were coming not to believe in the Devil himself. The reason was that Western Europe, followed in more or less short order by the rest of the world, was entering the modern era, the world of exploration, discovery, science, technology, individualism, capitalism, rationalism, materialism, democracy, progress. In such a world the old Devil was getting to seem both embarrassing and superfluous. When he appeared on the stage with his monkey suits and his conjuring tricks, he was only an unsightly clown—Ben Jonson summed it up in the title of one of his plays, *The Devil is an Ass.* And when you got down to the business of explaining what was going on around you, the Devil only got in the way. When Shakespeare's Othello learns too late how he has been tricked into murdering his wife and losing his soul, his first, medieval instinct is to look down at Iago's feet; then he pulls himself together and says, "But that's a fable." Iago doesn't need supernatural cloven hooves; he has all the wickedness he needs stored up in his own human heart. Bit by bit, the Devil's possessions and prerogatives were stripped from him.

Ben Jonson summed it up in one of his plays,
The Devil is an Ass.

When Benjamin Franklin called down a great spark from Heaven with a mere key hanging on a kite, all the army of infernal spirits that had been swarming through the air vanished, and the atmosphere became nothing but a mass of nitrogen and oxygen and other atoms, whirling around according to laws that Satan had never heard of.

Where the 13th-century Cistercian abbot Richalm blamed the Devil for the "wondrous sound that would seem to proceed from some distemper" of his stomach or bowels, a modern monk sends for a gastroenterologist. Great storms are no longer conjured up by the Devil, but by El Niño currents, and no one blames the wreck of the *Titanic* on anything but errors of judgment and faults of design. People are still possessed by devils, and the Roman Catholic church among others provides means of exorcizing them. But their numbers are infinitesimal compared with the number of people who are daily put under the care of psychiatrists.

The old-fashioned horror-show Devil virtually disappeared from the fine arts with the coming of the Renaissance. In 1505 Raphael painted a traditional picture of Saint Michael beating the Devil out of Heaven; the Devil is a kind of outsize science-fiction insect with horns and wings and a madman's gasping face. Thirteen years later he did another painting on the identical theme, but the Devil this time, though a pair of bat wings grows out of his shoulders, is otherwise wholly human, a young man writhing in the despair of defeat, a much more arresting and moving figure than the bland self-satisfied saint who is poking him with a spear.

The real gravedigger of the old brutal, terrifying, physically threatening Devil was John Milton, whose *Paradise Lost* was to influence the world's conception of Satan in a way no other work of art has ever done, though not at all in the way the author intended. It was designed to be an epic poem like those of Homer or Virgil, but told to "justify God's ways to Man," and dealing with creation, sin and salvation. In outline, it is a very orthodox story of pride and sin eventually humbled and destroyed by the infinite wisdom and goodness of God. Milton's Satan follows the theologically correct process of transformation from the

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IT'S NOT JUST WHAT WE DO.
IT'S HOW WE DO IT.

CARGILL

To adjust to this modern world, the Devil has had to change his ways.

most radiant of angels to the loathsome crawling serpent of Book Ten. Few readers, however, get to Book Ten of *Paradise Lost*. They are more apt to let themselves be lost in fascination with the Satan of the first books, a heroic figure of the first order, young, proud, self-confident, self-reliant, inventive, ingenious, yielding to no obstacle, defiant, who will not accept defeat even if defeat is inevitable, who values his own freedom more than happiness, who would rather "reign in Hell than serve in Heaven." These might be considered features of the tireless visionary entrepreneurs from Columbus to Bill Gates whose dreams and exploits have shaped so much of modern history, and provided the heroes for so many modern movies and novels.

But to the modern Devil, even more galling than his loss of physical power, his control of earthquakes and unholy wars, must be his loss of respect. The Prince of Darkness has become, in the view of Prof. Andrew Delbanco of Columbia University, in a book called *The Death of Satan*, a superannuated athlete who has gone on the lecture circuit.

He can always get a supporting role in a horror movie like *Rosemary's Baby* or a science-fiction thriller about a professor of comparative literature who carves up and cooks his more attractive students. But no one takes him really seriously. He is toned down, domesticated. Bowdlerized, he has become politically correct. As one of the title characters in John Updike's *Witches of Eastwick* remarks, "Evil is not a word that we like to use. We prefer to say 'unfortunate' or 'lacking' or 'misguided' or 'disadvantaged.'" Even hellfire preachers who make a specialty of describing in detail the horrors of the afterlife no longer say, as the church fathers of a more robust age used to do, that one of the joys of being in Heaven will be to watch sinners writhing in the hands of the Devil.

To adjust to this pallid modern world, the Devil has had to change his ways. Always an expert shape-changer, he now comes on most often in the form of Mephistopheles. The name was made up in a 15th-century German updating of the old Theophilus legend, which has Mephistopheles signing a pact with Dr. Johann Faustus, a professor-turned-magician who is more than willing to trade his soul for 24 years of unbounded knowledge, power and sex. Christopher Marlowe's play of *Doctor Faustus* would launch both the Faust story and the character of Mephistopheles on a fabulously successful career. He was followed two centuries later by Goethe with his epic drama *Faust*. Between them they created the modern Devil, witty, ironic, disillusioned, a much more complex and interesting character than Doctor Faustus himself. Unlike Faust, however, Mephistopheles never *does* anything; he just talks.

A goatlike Satan dominates a grotesque gathering in Francisco Goya's *Witches' Sabbath* (1800).

He talks very well, of course. He talks very wittily and convincingly in Dostoyevsky's *Brothers Karamazov* and in George Bernard Shaw's *Man and Superman*. He is funny in a sinister kind of way when in C. S. Lewis' *Screwtape Letters* he becomes a conscientious bureaucrat filling reams of paper with instructions to an Englishman on how to get on his mother's nerves. He looks very handsome and winning when he is played by Al Pacino in the movies. But out in the world of commerce, politics, wars and gross national product, he is little more than a joke.

For some observers like Professor Delbanco and Prof. Jeffrey Burton Russell, of the University of California, Santa Barbara, whose five-volume biography of the Devil is the most authoritative, this is a tragic situation; it means that America, like the modern world generally, has lost its sense of evil, and without a sense of evil a civilization must go straight to Hell.

Perhaps, however, he is not dead after all; he may only be in hiding. A 17th-century Englishman, Richard Greenham, was apparently the first to coin the phrase, later borrowed or reinvented by Baudelaire, Dostoyevsky, G. K. Chesterton and Whittaker Chambers, "it is the policy of the Devil to persuade us that there is no Devil." The Devil, after all, if he is anything, is the personification of evil, and no one can deny that there is plenty of evil around even in today's comparative peace and prosperity.

The psychiatrist Viktor Frankl was a young doctor in

SCALA/ART RESOURCE

In this 1795 work by Goya, demons lurk around a dying, impenitent sinner as Saint Francis of Borgia (1510-72) exorcizes him.

Vienna in 1940 when he and his wife were picked up by Nazi thugs and sent off to concentration camps. She was soon murdered, but he managed to survive through all five years of the war. One night, as he climbed up to his wooden bunk, he found the man next to him moaning and roaring and thrashing, in prey to the worst nightmare Frankl had ever seen in his years of medical practice. His every humane instinct as a doctor told him to wake the man up before he hurt himself, but as he reached out to shake him he suddenly remembered that the reality he would be waking the man up to was Auschwitz, with all its stenches and screams and heavy thudding blows, and that was a hundred times worse than anything the mere human imagination could make up in the confines of a narrow human skull. So he let the nightmare gallop on.

There were no devils running Auschwitz, only human beings doing an ill-paid job that they must have found unpleasant at times but which was clearly preferable to being sent to die in the hell of the Russian front. That does not mean the Devil was not there.

Most everyone these days has taken the pledge that there will be no more Auschwitzes. But such pledges have been taken before. Common sense tells us that we will go on performing wicked deeds of one sort or another till an automated virtue machine is patented or (more likely) till the end of the world.

Madame Carmelita, a psychic on the Upper East Side of Manhattan, has assured me that the world will end on or about my 100th birthday, February 18, 2018. And a science-fiction scenario might have the world (meaning human life) come to an end when a giant comet hits the earth, clearing the ground for little polyps that will evolve into creatures much nicer and more spiritual than us mere mammals. A scientist has assured me that the world (meaning life on earth) will come to an end when our sun becomes a red giant in the year 4,000,001,999. If in the meanwhile a sleek gentleman dressed as a prosperous options-and-derivatives salesman offers you fantastic odds on a bet that he will not be around right up to the last second on any or all of those occasions, and you take him up on it, you will probably be making a bad bet.

Common sense tells us that we will go on performing wicked deeds.

Robert Wernick reports that he has received many offers from the Devil but thus far has resisted his blandishments.

GIRAUDON/ART RESOURCE

The Gang's All Here

A NEW SHOW HAILS EDWARD SOREL, WHOSE CARICATURES HAVE SPOOFED OR SKEWERED CELEBRITIES OF EVERY STRIPE

In *The Warner Mob*, studio chief Jack Warner deals the big dough to his bad guys, c. 1938. How many of them can you identify? Answers below.

Answers: *Seated are, from left, Humphrey Bogart, James Cagney and Edward G. Robinson. Standing are, from left, George Raft, Eduardo Ciannelli, Barton MacLane and John Garfield.*

"THERE WAS A LOT OF yelling," says Edward Sorel of his childhood in the 1930s. "I was born in the Bronx—to factory-worker parents. We were Jews, and Fascism seemed to be everywhere. Half my family were Communists; the other half wished we could all get together without arguing politics." So, you might think Sorel took after the opinionated half. He's passionately antiauthoritarian, usually leftist. But he's no party-line man—he pokes at pomposity wherever he sees it.

He drew Maya Angelou and Billie Holiday (above) for *First Encounters*, a book he collaborated on with his wife, Nancy, a writer and historian. His illustrations complement her accounts of first meetings between notables from the past several centuries.

Over six decades, Sorel has published thousands of caricatures. He's done several books, and many of his drawings have become magazine covers, including 35 for the *New Yorker*. Sometimes his subjects call him: "The ones that break your heart are politicians wanting to buy the original art," he quips. "That's when you know you're worthless."

A new exhibition, "Edward Sorel: Unauthorized Portraits," is on view at the National Portrait Gallery through January 2, and can be seen in part at www.npg.si.edu. Sorel works "direct," explains curator Wendy Rick Reaves. "That means no tracing or erasing, and little preliminary sketching. With this sudden-death approach, Sorel's figures often emerge from a dense, wiry tangle of overlapping pen strokes that crackle with energy." Sorel says this is "an extremely eccentric thing to do in pen and ink." One blunder means starting over on a new sheet.

During the '60s he realized that having to work fast, under tight deadlines, improved his style by making it more intuitive—"I was beginning to understand what Degas meant by 'premeditated spontaneity.'" But even after all these years, drawing is intense work for Sorel. "I welcome any interruption while I'm doing it. My drawings have a lot of nervous energy—for the simple reason that I'm nervous."

Looking back, Sorel is glad he learned early on that if you use humor, you don't have to yell. Besides, he's had to help raise four kids by selling his art to magazines. "Unadulterated rage," he observes, "does not go well with four-color advertisements for Cadillac cars." —*Bruce Hathaway*

Far left: By the 1960s, Frank Sinatra was a megamogul with a huge personal staff. Sorel caught the "Chairman of the Board" glazing over while twitchy sycophants offer him a light. Left: Invited to Maya Angelou's home in 1958, Billie Holiday was rude at first. After lunch the jazz legend softened. Below left: In Sorel's takeoff on Pierre Auguste Cot's painting *The Storm*, Mia Farrow scowls at a lecherous Woody Allen. Below right: His pale suits, Tom Wolfe insisted, did not mean he was a fop; rather, he was a "counterbohemian." Sorel guessed that the writer would have been quite dismayed to notice a resemblance with John Travolta's movie disco king of the '70s.

Above: At "high noon," abandoned by allies alarmed by what they saw as zigzags from soft to tough, President Jimmy Carter fights injustice in the world. Top right: Amid allegations of corruption, Vice President Spiro Agnew resigned in 1973; Sorel imagined him as an advocate for a way to streamline government—legalize bribery. Bottom right: Elegant oval frames, elaborate cartouches and heraldic symbols enhanced portraits of nobility in the 17th century—apt flourishes, thought the artist, for Richard Nixon, whom he called "Milhous I." Far right: "That really is what I look like nude," says Sorel about his take on political victims relishing sweet revenge.

THE FIRST EMPIRE BUILDER OF THE NORTHWEST

LONG BEFORE BILL GATES, JAMES J. HILL BLAZED A TECHNOLOGICAL TRAIL, BUILT A FORTUNE—AND TESTED THE GOVERNMENT'S TOLERANCE FOR BIG BUSINESS

BY MINNA MORSE

ON A SUNNY MORNING IN OUR NATION'S CAPITAL, THE ATTORney General's office announced that it would be bringing one of the country's largest and most profitable corporations up on antitrust charges. The head of the corporation had emerged as an industry giant before he was out of his forties, and was both admired and despised for his achievements and tenacity. He was a family man, an art collector, a philanthropist who donated fortunes to schools and libraries. But first and foremost, he was a man consumed with his business—obsessed with cutting-edge technology and with its potential for carrying commerce into a vast new landscape.

The gentleman in question was known to write late-night missives to employees and associates—but at a rolltop desk, not a computer keyboard. He sought to control the means of transport not through cyberspace but through lands rich with natural resources. And he was called

Stacks of leather-bound ledgers form an appropriate backdrop for a portrait of Hill, who kept his eye so firmly fixed on the bottom line. To the left of the portrait, amid other memorabilia, lies a presumably unexpected—and certainly unwelcome—lunch invitation from Theodore Roosevelt.

GREAT NORTHERN RAILWAY
THE GREAT NORTHERN STEAMSHIPS & RAILWAYS
THE GREAT NORTHERN COUNTRY
Manitoba Railway
Pacific Railroad,

At a celebration of his 74th birthday, Hill (center, his hand in his waistcoat pocket) stands with associates in front of the *William Crooks*, the first locomotive in Minnesota Territory, and one of the first acquired by Hill in the late 1870s.

GRANGER COLLECTION; P. 131 RICHARD WALKER (ARTIFACTS FROM HILL MANUSCRIPTS AND MINNESOTA HISTORICAL SOCIETY)

on the government's carpet not at the end of the 20th century but at the century's beginning.

HIS NAME WAS JAMES J. HILL, A man known far and wide as the "Empire Builder of the Northwest." He helped make possible the metropolis of Seattle that a certain modern-day empire builder calls home. And in 1902—in a landmark case that launched Theodore Roosevelt's reputation as a trustbuster—Hill's empire became the first real target of the antitrust legislation that has been so much in the news of late.

At the forefront of the greatest technological and societal shift of his day, this portly powerhouse brought the rails of progress into the Northwest, and thousands of immigrants and homesteaders along with them. "Give me enough Swedes and whiskey," Hill is said to have declared, "and I'll build a railroad to Hell." From his base in Saint Paul, Minnesota, Hill drove his roads ever westward—through the Dakotas, Montana and on to Puget Sound—creating communities, controversy and an enormous fortune on the way.

The late 19th century gave birth to many such fortunes, of a magnitude never before seen in the New World. It was a time of tremendous growth, emerging technologies and industries, and few laws prescribing how business should—or shouldn't—be conducted. Those who had the will (and generally, the wile) to take full advantage of these circumstances made names for themselves that still resonate today: Rockefeller, Carnegie, Gould. Outside of Hill's adopted city of Saint Paul—where his somber fortress of a home still dominates Summit Avenue—few today remember the name of James J. Hill. But in his day, there wasn't a soul in America who didn't know the name, or have some opinion of the man.

"Who made the world, Charles?" a fictional teacher asks her student in a 1902 magazine article. "God made the world," the student replies, "in 4,004 BC. But it was reorganized in 1901 by James J. Hill, J. Pierpont Morgan, and John D. Rockefeller."

HILL WAS BORN INTO A SCOTS FAMILY in the fall of 1838, near Guelph, Ontario, in Canada. Fifth in a line of firstborns named James Hill, this one

The fact is, if you're 60 or older, there's a nearly 1 in 2 chance you have osteoporosis, no matter how healthy you look on the outside. Because early on, osteoporosis is a silent disease, which means you may not see any signs. But eventually osteoporosis can lead to broken bones, or the disfiguring dowager's hump, unless you catch it early enough to try and prevent that.

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The Northern Pacific, whose crews are shown grading a railbed in Dakota Territory, was Hill's greatest competitor for years, until it became part of his empire in 1896.

decided to distinguish himself with a middle name. Obsessed with Napoleon Bonaparte—to whom he was similar in stature and, arguably, in temperament—but afraid that the middle name Napoleon might seem too pretentious, Hill took the name of the emperor's brother, Jérôme.

At 17, he boarded a train to Toronto, continuing on to New York and America's Eastern Seaboard. He'd always dreamed of visiting the Orient—even of operating a fleet of steamboats on the Ganges. But he soon discovered that the only way to the Far East would be as a common sailor on a merchant ship. So he "took a notion" to go west instead.

SAINT PAUL, LYING AT THE HEAD of navigation of the Mississippi, was an obvious choice for a young man fascinated by trade and steamboats. Though still a dusty frontier town, it had become the hub of trade for the Minnesota Territory and points beyond. Hill quickly secured a job as a shipping clerk in the town's burgeoning steamboat business. When the Civil War came, many of his fellow future magnates—John D. Rockefeller and Jay Gould among them—managed to avoid active service. Hill actually tried to enlist, even though he was not an American citizen (and would not become one until 1880). Rejected because of a childhood injury that had left him blind in one eye, he returned to clerking. But by war's end, Hill—and the country—were poised for change.

In 1865 he stepped out on his own, securing exclusive or nearly exclusive contracts with the Northwest Packet Company and two local railroads: the Milwaukee and Mississippi and, in 1866, the Saint Paul and Pacific. Early on, a local paper wrote: "Go it, James! We always knew you could do a heavy business, but we confess to a little surprise in seeing you . . . monopolizing to such an extent."

In 1872, he formed the Red River Transportation Company with Norman Kittson, a steamship operator and fellow Scot. Under Kittson's tutelage, Hill honed his craft as a competition-crusher, engaging in rate-slashing and other tactics (including, on one occasion, "accidentally" ramming a competitor's steamboat).

Steamboats, however, were on their way out, and Hill knew it. In 1862, Congress had passed the Pacific Railway Act, granting select railroad companies huge swaths of land to build transcontinental lines. After the war, construction began in earnest, and on May 10, 1869, at Promontory, Utah, the first such line was completed.

That same year, a long-neglected charter for 47 million acres of Northwest land, the famous Northern Pacific charter, fell into the hands of Civil War financier Jay Cooke. Cooke sent agents to Europe to encourage emigrants to buy and settle his property between the Great Lakes and Puget Sound. His efforts to raise $100 million for the railroad, however, ended in 1873 with the bankruptcy of his large and established firm. That, in turn, led to panic, a ten-day shutdown of the New York Stock Exchange—and the worst depression the country had yet experienced. More than 18,000 businesses—including most railroads—went bankrupt in the years that followed.

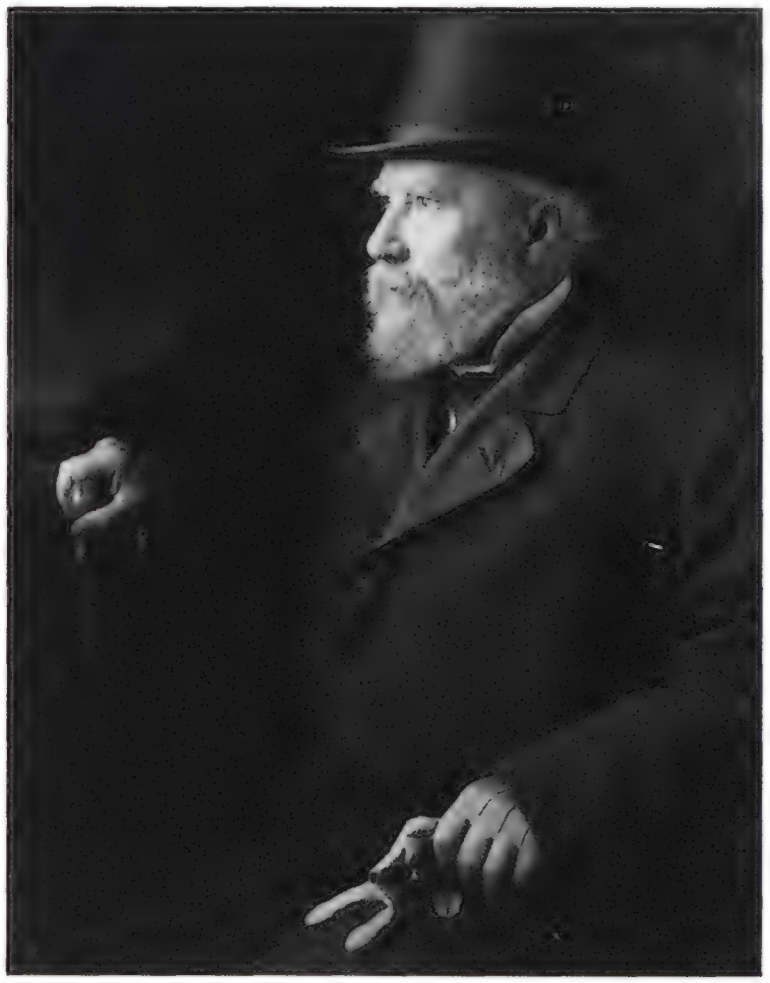
One of those lines, to Hill's delight, was the local Saint Paul and Pacific, with which he had once worked so closely. Hill calculated that with a total investment of $5.5 million, carefully spent, the Saint Paul and Pacific's purchasers could have a railroad and land worth some $19 million. He recruited the help of Kittson and two Scottish Canadians with far deeper pockets: the chief commissioner of the Hudson's Bay Company and the president of the Bank of Montreal.

Together, they made sure the property looked shabby for the Dutch investors who now controlled it; undersold the railroad's potential; and—with the aid of the foreign investors' own adviser, New York financier John S. Kennedy—were able to purchase it for a song. Even before the papers were signed in 1878, Kennedy became the fifth partner in Hill's investment group—with no apparent concern over the conflict of interest.

Hill was the junior member of this bunch, but it was clear from the start he had the most knowledge of railroads, and the greatest vision for the renamed Saint Paul, Minneapolis and Manitoba Railroad. Within one year, he had completed construction north to the Canadian border; within four, he was named president of the railroad.

Where Jay Cooke's agents had sung the praises of the "Mediterranean of the Northwest," Hill's men in Europe declared the area around his railroad the "Nile of the North." Starting in the 1880s, they helped Hill sell land to tens of thousands of emigrants—mostly Swedes and Norwegians. The newcomers were promised cheap passage to the West if they agreed to settle and farm the land along the Manitoba line—thus becoming dependent on Hill and his associates to transport their produce by rail. By 1889, Hill had built a branch to the Great Lakes and had extended westward into Montana.

Over the years, Henry Villard, who had taken control of the bankrupt



Hill, shown here just months before his death in 1916, praised the efficiency of monopolies.

GRANGER COLLECTION; HILL MANUSCRIPTS, HILL REFERENCE LIBRARY, SAINT PAUL

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ENDLESS POOLS

Northern Pacific in 1881 and extended it westward, often asked Hill if he would sell the Manitoba—but Hill wasn't interested. He saw the mistakes Villard had made with his road—grades too high, curves too deep—and he determined to make a more efficient line to the Pacific.

Hill toiled nearly round the clock. "I often worked in my office until one in the morning," he once recalled. "One night my wife said she would go to the office with me and bring me home at half past ten. It was a summer night and I gave her a book and a chair by the window, where she presently fell asleep." At 2 A.M., he woke her and escorted her home.

A STICKLER FOR DETAIL, HILL often visited the men on the line to make sure they were doing their work properly. Farmers had gotten used to seeing the short, bearded man studying their fields himself in search of the lowest, most even tracks of land. Where such stretches weren't available, Hill would have his workers move tons of earth to create them. Leveling the landscape to make for lower grades, he knew, was an expensive investment, but one that would enable him to carry more tonnage more quickly and efficiently.

It was Jim Hill's dream to create a network of railroads from the Great Lakes to the Pacific Coast, bringing the products of the industrial Northeast to new markets in the northern plains and Northwest, and bringing the riches of that region—grain, cattle, minerals and lumber—back to the rest of the country. And behind that dream lay the presumption that his railroad would ultimately rule transportation in the region, unencumbered by competition.

When a group from Minneapolis began building a parallel road westward from the Twin Cities, Hill became incensed. He encouraged his workers to thwart the progress of the new line—by whatever means necessary—and soon brawls began among the workers of the two roads.

When the owner of two copper mining firms in Butte, Montana, needed a site along a railroad for a water-rich smelter, the options were nearby Helena, on the Northern Pacific, or the more distant Great Falls, on Hill's Manitoba line. Hill made the choice an easy one by slipping the businessman 1,500 shares of his Great Falls Townsite Company.

Often accused of bribing legislators as well as businessmen, and certainly "guilty" of using his power and influence in the halls of government, Hill could not abide it when others did the same. In 1886, President Grover Cleveland vetoed a bill to give Hill a right-of-way through a reservation in Montana, apparently under pressure from allies of the Northern Pacific. To one of the NP's allies, Hill allegedly vowed to "nail every one of your crooks to the doors of the Capitol by their [expletive] ears" if they ever dared to intervene again. (Ultimately, he got his right-of-way.)

In facing what was perhaps his biggest hurdle—the Rocky Mountains—Hill hoped to find a more direct route west, and an easier pass over the Continental Divide, than that taken by the Northern Pacific. In 1889, Hill's chief engineer found the perfect route in Marias Pass, the lowest crossing of the Northern Rockies, along the southern border of what is now Glacier National Park.

By 1893, Hill had brought his line into Seattle, making the railroad-hungry port city the Empire Builder's terminus on Puget Sound—and the Pacific Coast. To best the Northern Pacific once more, he had promised Seattle a beautiful train station, but it would be 13 years before he made good on his word. For the time being, he offered only this bit of wisdom: "He is a wise farmer who develops his farm before he builds a palace on it."

In the meantime, Hill—now 55,

NO MOLLY-CODDLING HERE

Wielding a big stick at home, the often-caricatured Teddy Roosevelt was depicted laying low the widely hated railroad and oil trusts and, while he was at it, "everything in general."

with a stately paunch, bushy gray beard and his signature western-style homburg hat—had built his own palace. He and Mary, his wife of 26 years, had recently moved into a magnificent 36,000-square-foot red sandstone mansion overlooking the Mississippi, replete with a grand foyer, 13 bathrooms with modern plumbing, and a sky-lit art gallery (with pipe organ) for Hill's growing art collection. Hill had purchased homes in New York and Paris, contributed heavily to political campaigns, and even bought into the famous retreat of the country's richest families: Jekyl Island, off the Georgia coast.

He had become one of the wealthiest, most powerful men in America, a member of a new elite of financiers and captains of industry. His roads would prove instrumental in the economic development of the Northwest—filling his coffers and those of his fellows through trade in lumber, copper and iron ore, and other commodities transported by rail.

More than any other industry in the era following the Civil War, the railroads stimulated the nation's economy, and in the process, utterly reshaped it. Americans had access to material goods that before had been beyond their means, if not their imaginations. But at the same time, the nation's businesses and industries had become unimaginably large.

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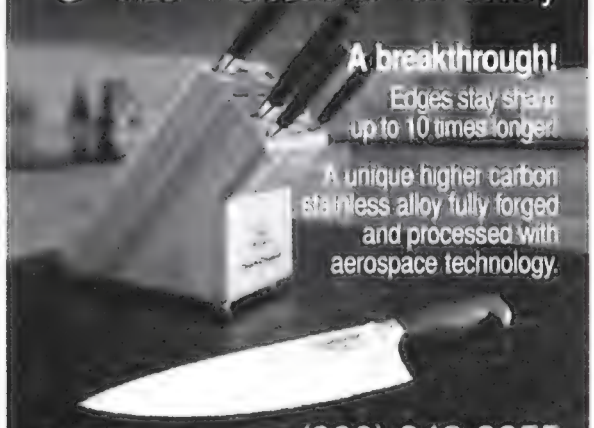
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In his later years, Hill took to the lecture circuit, promoting advances in agriculture. Here, he addresses a crowd at a 1914 county fair in Saint Cloud, Minnesota.

then raised rates to whatever the very-narrow market would bear. Without competition, they were also free to underpay and overwork labor, since workers often had few other options. Because the railroads profited most from heavy tonnage, their owners bent over backward to secure the business of large shippers, offering low rates and rebates—and assurances (so central to the big antitrust dispute of our day) that they would carry no competing products. Long hauls were often cheaper than short ones, or shipments in one direction cheaper than the return trip. Farmers, laborers and small businessmen felt suddenly powerless in the face of big business. Particularly in the newly settled West, many Americans were grappling with—and coming to sorely resent—what a century of industrialization had wrought.

It was in this context that the U.S. Congress passed the Interstate Commerce Act of 1887 and the Sherman Antitrust Act of 1890. The first came in response to a controversial court ruling that found that states had no jurisdiction over interstate trade, made ubiquitous by the growth of the increasingly unpopular railroads. The second, sponsored by Ohio senator John Sherman, was also intended, in part, to quell public unrest over big business. Congress needed to do something to pacify the angry masses, Sherman argued, lest the country

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be vulnerable to "the socialist, the communist, the nihilist."

John Sherman—the younger brother of William Tecumseh and former Secretary of the Treasury—was not antibusiness. He favored an open market in which businesses competed fairly for consumers. But the new industry giants, he argued, "are not satisfied with . . . competing with each other, and have invented a new form of combination . . . that seeks to avoid competition. . . . "

The Sherman Antitrust Act of 1890 passed nearly unanimously through Congress. It declared "every contract, combination in the form of a trust or otherwise, or conspiracy, in restraint of trade or commerce among the several states, or with foreign nations" to be illegal. Likewise, any "attempt to monopolize" a part of that trade or commerce. But Sherman Act or no Sherman Act, in the coming decade, the railroads and other big businesses advanced pretty much unchecked—at least those that survived a devastating depression in 1893.

Hill's railroad—redubbed the Great Northern Railway—was the only transcontinental to survive the depression. Not only did his road reach Seattle that year, but by drastically cutting costs—laying off more than a thousand workers and slashing the pay of those who remained—Hill's company continued to provide its investors with solid dividends.

For the workers who had relocated to the West, and had no other means of employment in the region, however, the depression of 1893 was disastrous. Of the hate mail Hill received from bitter railroad men, at least one letter quite literally hit home: "It would be a fitting climax if you should be taken by your employees and hung by the neck till dead, from one of the triumphal arches so recently erected at the expense of the very people you are now defrauding of their hard earnings." The letter was sent in care of Hill's wife.

That painful year saw the birth of the largest union of railway workers yet organized, the American Railway Union. In spring of 1894, when workers heard that Hill was sending agents to Helena, Montana, to fire any ARU members there, the union launched its first strike—against Hill's railroad. Federal marshals were too busy with other populist uprisings to lend Hill a hand. But later that year they were only too eager to break the ARU's famous Pullman Strike—as a violation of the Sherman Antitrust Act.

IRONICALLY, THE SHERMAN ACT was often employed during the 1890s not against corporate giants but as a means of union-busting. Strikes, after all, could easily be construed as "restraint of trade." In point of fact, the courts of the '90s consistently made their disdain of antitrust law quite clear—and business responded in kind. Between 1896 and 1900, at least 60 industrial combinations were formed whose capital exceeded $10 million—53 of them in the last two years of the century.

Hill rushed to join the merger mania. To the south of Hill's line lay the competing Northern Pacific, a nearly parallel road that had been one of the fatal victims of the 1893 depression. Though blocked from an official merger (by a Minnesota law and a populist state attorney general), Hill recruited the help of J. Pierpont Morgan to reorganize the bankrupt railroad and develop a cooperative agreement between it and the Great Northern. The two would "form a permanent alliance, defensive, and in case of need offensive, with a view of avoiding competition. . . . " In 1896, the Northern Pacific, for all practical purposes, became part of the Great Northern empire.

The next step for Hill was acquiring a link to Chicago—in the form of the Chicago, Burlington and Quincy Railroad. But Hill was not the only railroad man who wanted that line—

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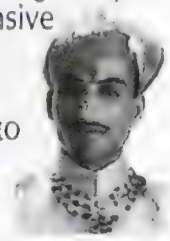

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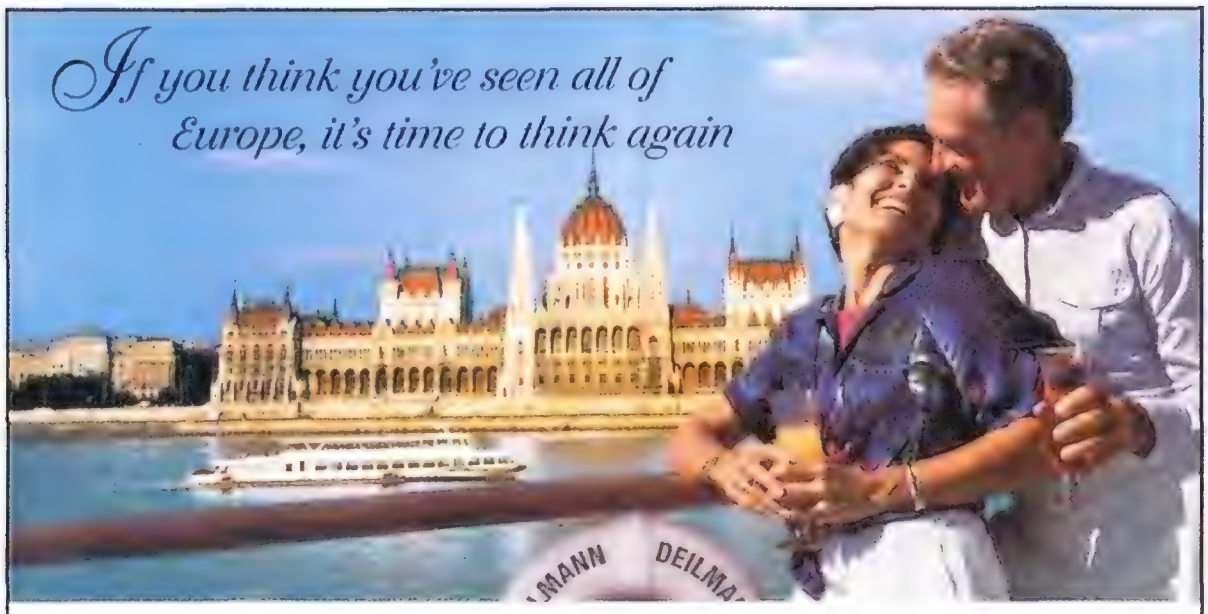

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nor was he the only one to have profited from the 1893 depression. By 1901, Edward H. Harriman—Hill's match in intensity and determination—had also managed to amass an enormous Western railroad network, and he, too, wanted the Burlington.

Hill—backed again by J. P. Morgan, and favored by the Burlington's owner—emerged with control of the railroad. But Harriman was not one to give up a fight. If he couldn't have the Burlington, he would have control of the larger feather in Hill's cap: the Northern Pacific. The Hill-Morgan syndicate was easily the largest shareholder of NP stock, but it still

Hill's truce with nemesis E. H. Harriman led to a landmark antitrust suit.

owned less than half. With the help of William Rockefeller (John D.'s brother) and banker Jacob Schiff, Harriman began secretly buying up shares of NP stock.

Hill was out West when he noticed a sharp and sudden rise in the price of Northern Pacific stock. Legend has it he had the tracks cleared, and made haste in his private railroad car for New York City to confront Schiff and his colleagues. He then charged into the House of Morgan to let them know they'd been caught sleeping on

HILL MANUSCRIPTS, HILL REFERENCE LIBRARY

the job—only to find that Morgan was, in fact, resting in the Alpine resort of Aix-les-Bains. By wire, Morgan gave his associates the go-ahead to start buying up $15 million of NP stock for Hill.

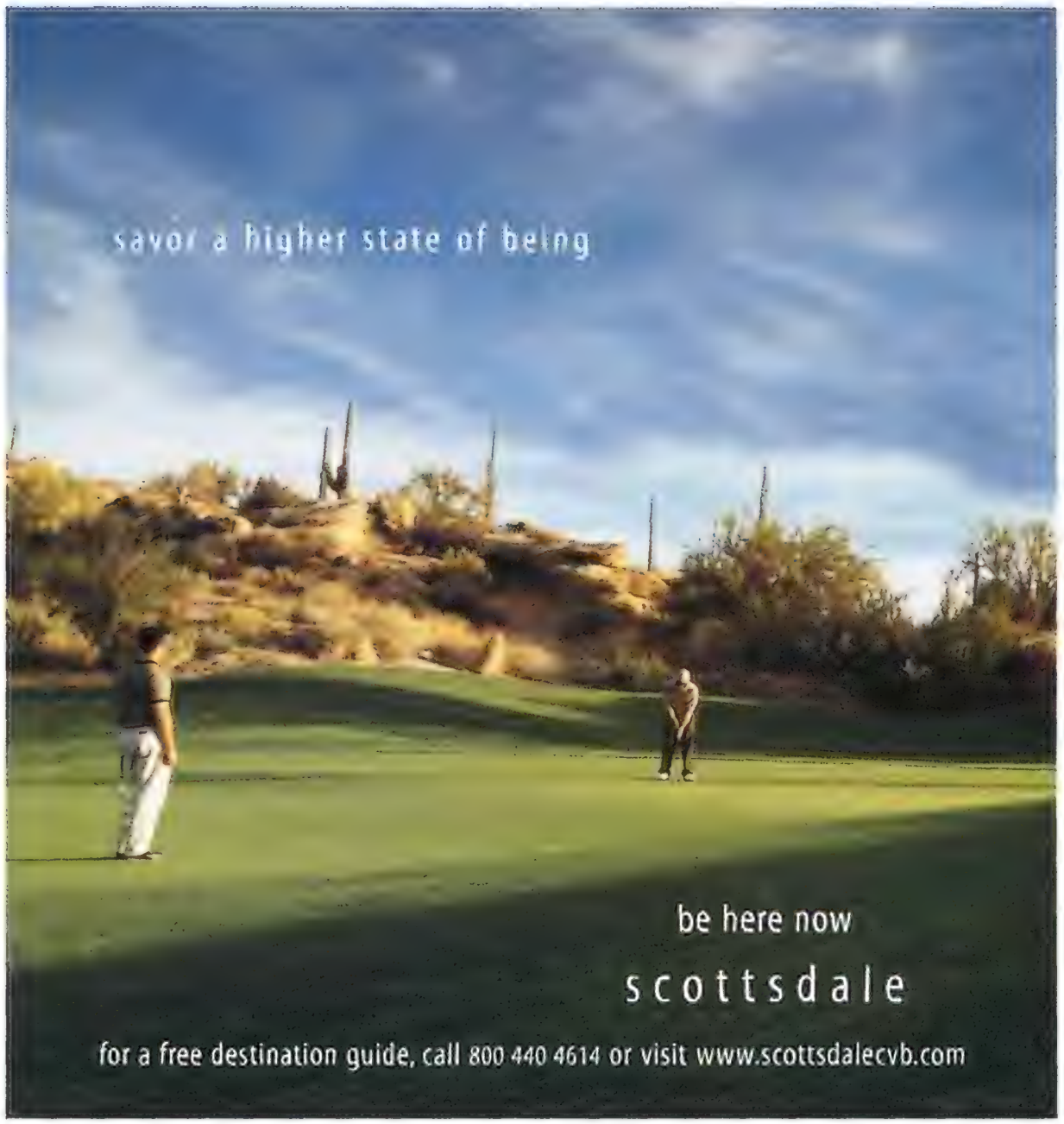
When the market opened on Monday, the price of NP stock stood at $114 a share. By Thursday, it had soared to $1,000. Firms that had sold short went under. Other stocks plummeted. Money dried up—and panic set in. The *New York Times* called Hill and Harriman "cowboys on a spree . . . shooting wildly at each other in entire disregard of the safety of the bystanders." (Asked for his comment, Hill quipped: "I have no statement to make. I have been too busy today buying locomotives.")

TO STOP THE TURMOIL, THE Hill-Morgan and Harriman-Schiff contingents hammered out a truce. They created a "holding company"—the Northern Securities Company—which would oversee the management and finances of all of Hill's concerns: primarily the Great Northern, the Northern Pacific, and the Chicago, Burlington and Quincy. For all the bother, Harriman hadn't managed to gain control of the Northern Pacific; nonetheless, he was given a seat on the board and stock in the new company. Hill and Morgan, of course, retained controlling interest.

Rather than waste energy in needless competition, and risk such disturbances of the market as they'd just experienced, Hill and his associates argued, the formation of their holding company was a stabilizing influence, and made the management of the roads far more efficient.

It also put the railroads of a region into the hands of a very few men.

Hill, it seemed, had not only survived the worst attack of his career—but thrived. He now controlled the largest transportation conglomerate in the country, perhaps in the world: stretching from the Great Lakes to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Seattle, and onward—as he'd always dreamed—via steamship to the Orient. But his troubles were not over.

On September 14, 1901, President McKinley died from an assassin's bullet. His Vice President, Theodore Roosevelt, would now take his place. Hill's old colleague John S. Kennedy assured him that though Roosevelt was young (just shy of his 43rd birthday), "I have every confidence that he will conduct the affairs of the country wisely and well." He is "thoroughly honest," Kennedy added, and has "the courage of his convictions." But what Kennedy did not understand was that among the new President's convictions was the notion that business should not become so big that its leaders need not answer to the people.

"There had been in our country," Roosevelt would later write of this period, "a riot of individualistic materialism, under which complete freedom for the individual . . . turned out in practice to mean perfect freedom for the strong to wrong the weak. The total absence of governmental control had led to a portentous"—and dangerous—"growth in the financial and industrial world."

On February 20, 1902, Roosevelt's Attorney General, Philander C. Knox, announced that the government intended to break up the Northern Securities Company. J. P. Morgan rushed to Washington to meet with the President. "If we have done anything wrong," he implored, "send your man to my man and they can fix it up." Roosevelt coldly explained that he had no interest in fixing anything up. "I have ordered taken down the fences of a very great and very arrogant corporation," Roosevelt would later declare. In the meantime, he assured Morgan that he had no designs on the financier's other interests, "unless we find out that . . . they have done something that we regard as wrong."

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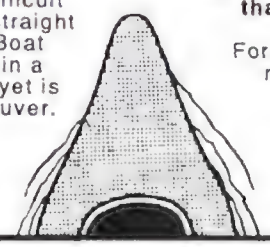

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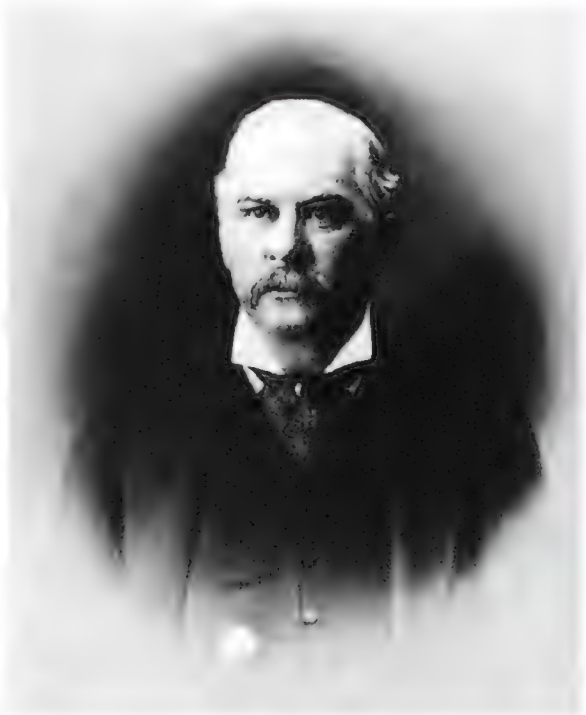
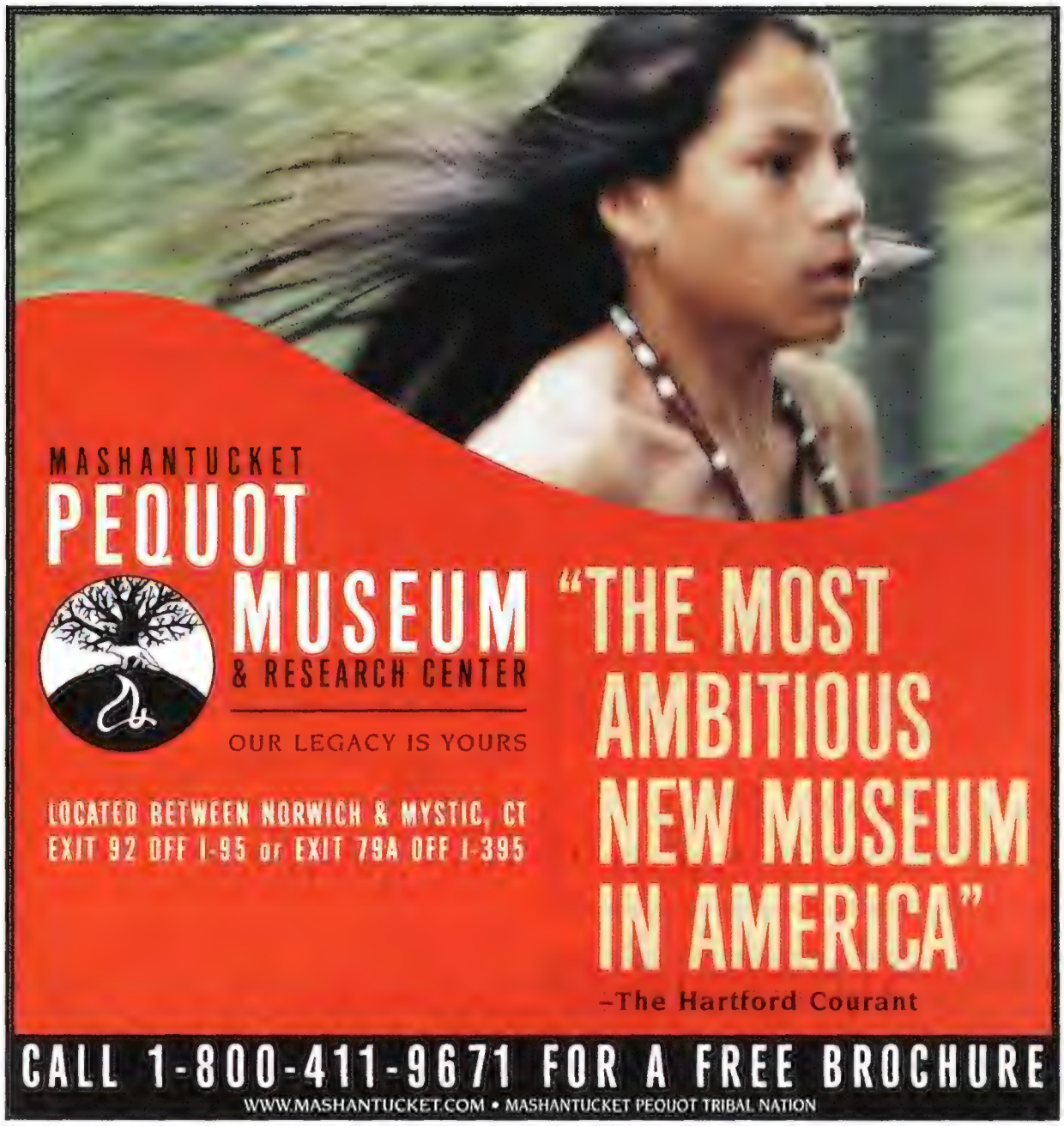
Morgan was, in fact, most concerned with those "other" interests and might have been willing to sacrifice Northern Securities to pacify Roosevelt. He was particularly worried about the fate of his recent, carefully orchestrated creation of U.S. Steel, the largest corporation ever known. But Hill was determined to fight. "The fortunes of railroad companies are determined by the law of the survival of the fittest," Hill argued. Competition was wasteful and combinations "merely an incident on the road to efficient service." Surely the courts would appreciate that, even if Roosevelt refused to.



J. P. Morgan, Hill's business partner, tried in vain to negotiate with Roosevelt.

On April 9, 1903, the U.S. Circuit Court of Appeals in Saint Paul decided unanimously against Hill. When a Minnesota court, in a parallel suit at the state level, ruled a few months later that no law had been broken, Hill found reason to be optimistic. In March 1904, he and Mary bought a unit in a building on Jekyl Island called—hopefully, or ironically—"Sans Souci" (Without Worry). But before the month was over, the Supreme Court had weighed in with its decision: 5 to 4 against the Northern Securities Company.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Hill's empire was broken into its component parts—and not easily—but in the end, he still controlled the same empire. It was simply an empire that would not, at least until long after Hill's death, be united in a single corporation. Roosevelt's bravado sparked a new era in the government's relationship with big business. He initiated 41 more antitrust suits during his administration, and he pushed for tighter regulation of railroads. Within a decade, legislation was enacted that would forever strengthen the Sherman Act.

HILL WOULD DO BATTLE WITH Harriman again (and emerge victorious) as he continued to build his empire in the Northwest. Before his death in 1916, Hill devoted much of his energy and celebrity to promoting agriculture in the plains of Montana and the Dakotas—a region that, at the time, was receiving an unusual amount of rain. Only after his death, when the plains dried up, would his efforts prove foolhardy, and disastrous for thousands of farmers. Suddenly his name, if not the land he had promoted, was mud. For years, schoolchildren would recite the rhyme: "Twixt Hill and Hell there's just one letter. Were Hill in Hell we'd feel much better." During his lifetime, however, Hill's only great failure—as far as he was concerned—was the breakup of Northern Securities.

"I've made my mark on the surface of the earth," Hill once declared, waving his hand across a map of the nation, "and they can't wipe it out." No truer words may be said. Hill and men like him forever changed the physical and economic landscape of this country. Their conduct, meanwhile, raised questions about power and progress that we continue to struggle with today.

Minna Morse is an assistant editor at SMITHSONIAN. *Her most recent article, about Stone Mountain, Georgia, ran in January 1999.*

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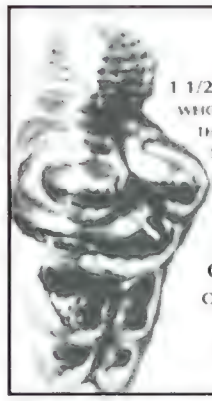

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A Home in the Heart of a City

Kathleen Hirsch, North Point Press, $24

IT'S AN OUT-OF-THE-WAY PLACE, Jamaica Plain, Massachusetts, or "J.P.," as the residents of this Boston neighborhood call their turf. "No one who comes to Boston to view the SS *Constitution* makes a side trip to Jamaica Plain," notes author Kathleen Hirsch of the place she describes as a "snob's no-man's land, a Boston neighborhood down at the heels for so long that only its loyalists can quite see its quirky charms."

Hirsch moved to J.P. in the summer of 1990. She was in her mid-30s, in search of "that most rare and vanishing of life-forms, authentic neighborhood life." What she found was "a crazy quilt of groups, distinct traditions, and differentiated residential neighborhoods that overlap and criss-cross one another in hundreds of different ways."

Hirsch made this leap of geography, and faith, from a decade of living in Boston's Back Bay, a tony neighborhood of cappuccino bars and upscale art galleries where she discovered that her "assumption that, in the course of living and socializing in a place, my roots would reach down into bedrock and anchor me to life in the fullest sense had proved naive."

Hirsch's exploration of her inner landscape—the beliefs and hopes that brought her to J.P.—lean toward the heavy-handed. Her writing is at its best when she looks outside herself, introducing the reader to Jamaica Plain and the people who live there. "This is their story," she says, "the

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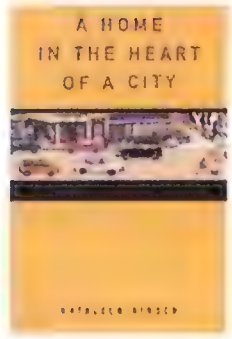

They discovered that they missed the chaos and cacophony of J.P.

story of what is still possible in our lives, even in the heart of a large American city."

If all the residents of J.P. are as colorful and sympathetic as the ones in the book, one can understand why Hirsch is so taken with the place. There's Christine Cooper, a poet and artist who, in the early '80s, singlehandedly began the successful restoration of Jamaica Pond, today one of the crown jewels in Boston's Emerald Necklace, a string of parks that ring the city.

The reader meets Winky and Charlie Coherty, who had fled J.P. for Warren, Michigan, a place of "tidy brick ranches and perfect green sod," only to discover that they missed the chaos and cacophony of J.P. — the "sweaty neighbors out holding hoses just waiting for a good yarn to turn up." The Cohertys, observes Hirsch simply, "lasted a year, before they decided to return home."

A THRIVING COMMUNITY GARDEN

THERE'S KATHIE MAINZER, A NO-NONsense entrepreneur who has turned a bar where "gunshots and knifings had once been de rigueur" into a popular pizzeria. We make the acquaintance of Peter Rosenbaum and Sue Naimark, who created a thriving community garden in "a scorched-earth scene of toppled buildings" where "doll parts and curtain rods stuck up from the dirt, picture frames and old bills lay scattered half-buried in ash." And we meet Veronica Serrato, a corporate lawyer who left an $80,000-a-year job

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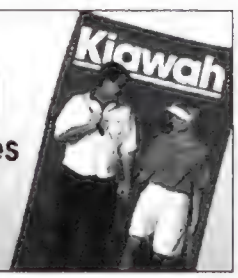

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Hirsch's favorite haunt is Doyle's Pub, which boasts "one of the longest mahogany bars this side of Galway . . . and endless platters of fish and chips and onion rings." But food, the author tells us, is not, ultimately, what Doyle's is really about. "It's about sociability, neighborliness, the stretches and strokes of public recreation. Here," she notes, ". . . we are at home away from home: one family, one tribe, one community."

STANDING AT A CROSSROADS

FOR ALL HER TALK OF COMMUNITY and belonging, however, I was never able to shake the feeling that Hirsch is more observer than participant, the people she describes as much subjects as friends. She herself says, commenting on this complex process, "To observe, as I've noticed many times . . . when I might suppose that I'd stand out most awkwardly, is to be oddly nullified. . . . Either there is something in the observing stance that says, Discount me from the logic of whatever is happening; I am not a player. Or we are all invisible to one another most of the time and just don't take notice of this fact, we are so preoccupied by our own concerns."

Ironically, one of Hirsch's concerns may take her away from the community she celebrates in her book. The schools in J.P. are abysmal, and one by one she watches her friends move to neighboring suburbs—"claustrophobic towns, with their idyllic boutiques and border strip malls and little else in between except, of course, the schools." The author's own son is nearing school age. "Soon," she writes, "I too will stand at this crossroads." One wonders which road she'll choose.

Reviewer Emily d'Aulaire writes from her home in Connecticut.

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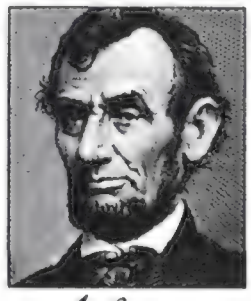

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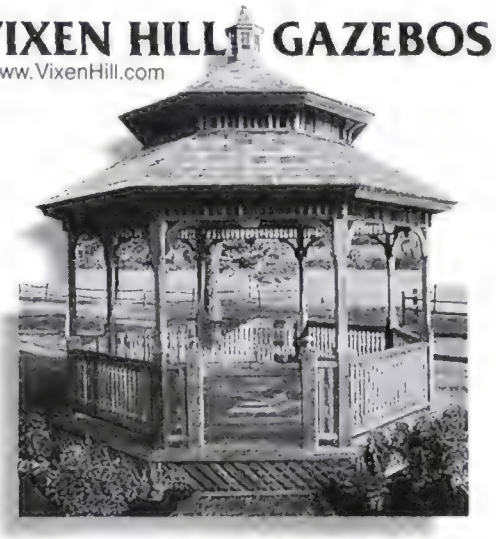

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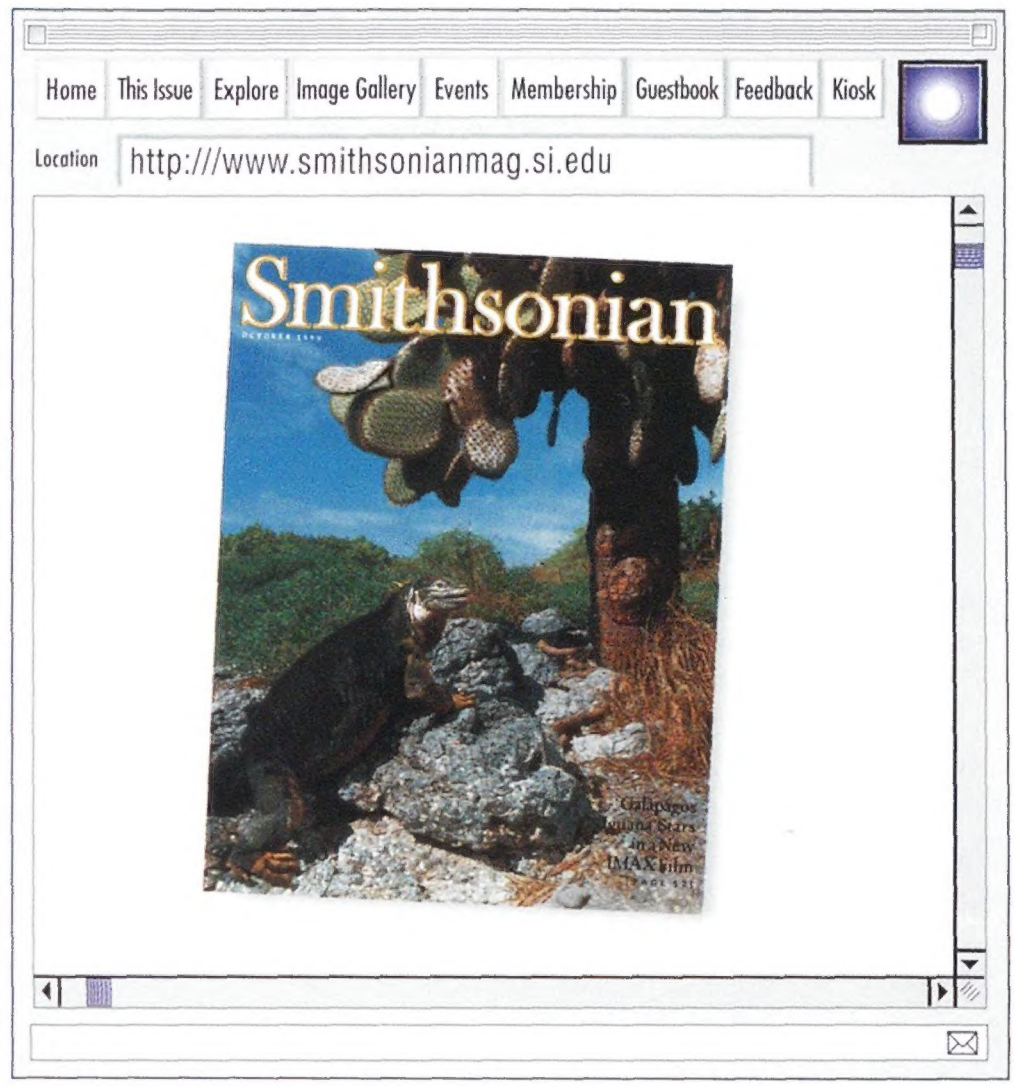

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THE LAST PAGE

This Is My Grandfather's Oldsmobile

BY ANDREW COHEN

ON THE DAY AFTER MY 27TH birthday, I looked out the window and was astonished to see my car flanked by two fire trucks. Flames poured from the engine. I went outside and found shards of glass scattered on the pavement around the melted front tire. A fireman holding an axe asked me if the vehicle was mine. I nodded, and he said, "Say goodbye." Then a tow truck came and took my gray 1985 Oldsmobile Ninety-Eight Regency Brougham away.

The car originally belonged to my grandfather Aron, who rode horses and leaped from moving trains as a boy in a small village in Poland. He later became a butcher on the Jersey shore. He had arms as thick as butcher blocks, from which he would swing us kids. I remember how he tapped his scarred fingers against the kitchen table as he spoke to my parents in self-conscious English about Wall Street and Israel. He was handsome, with pale blue eyes and a gentle, gap-toothed smile. In grade school, I wrote an essay about how I wanted to be like him: temperate and thoughtful, the treasurer of my synagogue, and cherished by my family.

He had been in a nursing home for several years when my parents discussed giving me his car. I was hesitant. I wanted his blessing. So I visited him one day and explained how I would be honored to drive his car. He nodded and smiled and kissed me with dry lips.

He died not long afterward. In the years that followed, I drove his car proudly. It had plush leather seats, automatic everything and a top-of-the-line stereo. I was confident it would get me where I was going not only because it was a big, reliable car but because it was my grandfather's.

People called it a "boat" or a "tank." They parodied an ad campaign that said, "This is not your father's Oldsmobile," saying instead, "This *is* your father's Oldsmobile." I laughed and said, "No, this is my *grandfather's* Oldsmobile," and then told them about my grandfather the butcher from Poland, and his wife, Pearl. Even when the vinyl roof leaked and the engine burned too much oil; even when my family urged me to get a new car, I kept it because it was his.

A fireman asked me if the ruined vehicle was mine. I nodded, and he said, "Say goodbye."

After the Olds was towed away, I wistfully recalled my father's descriptions of his old Brooklyn neighborhood, in which his grandparents, aunts, uncles and cousins all lived within shouting distance. In that respect, at least, it was not much different, I imagined, from the village my grandfather left behind in Poland. For me, the Olds was a souvenir of the past that had helped console my longing for such a close-knit community, but I realized it meant something very different to my grandfather.

The Olds spoke to his pride as an American businessman—one who dealt in nonkosher meats and worked on the Sabbath. For him, and for a generation of immigrants like him, an automobile was a symbol of assimilation and success.

The adjuster declared the Olds "a total loss." I took a few snapshots of it in the tow yard and walked away. Eventually, I replaced the Olds with a sporty black import. At first, I felt a little guilty; it was almost as if I had betrayed my one true love. But I got over it. I knew my grandfather would have been happy to know I finally had a car of my own.

JIM FLANAGAN

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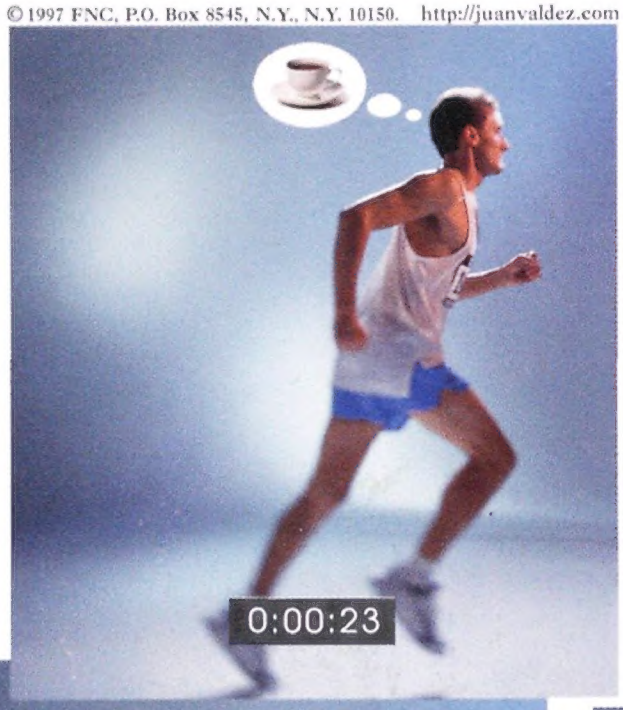

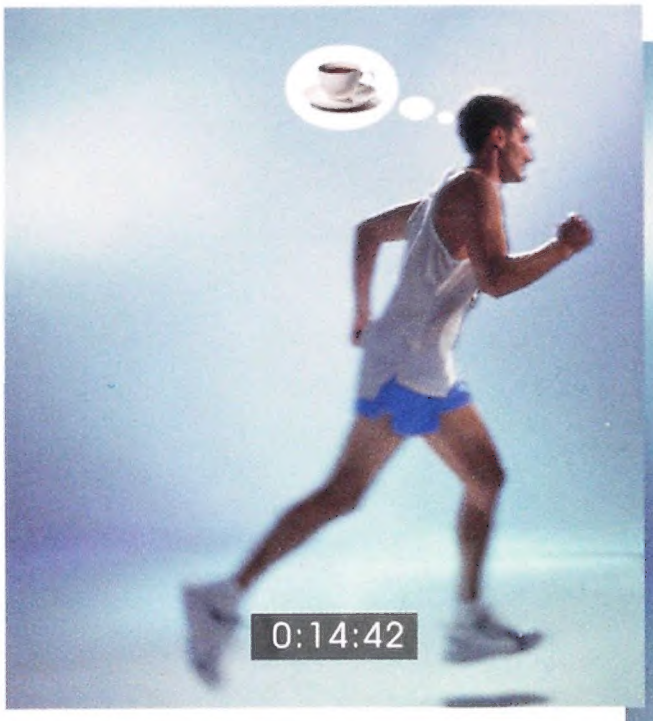

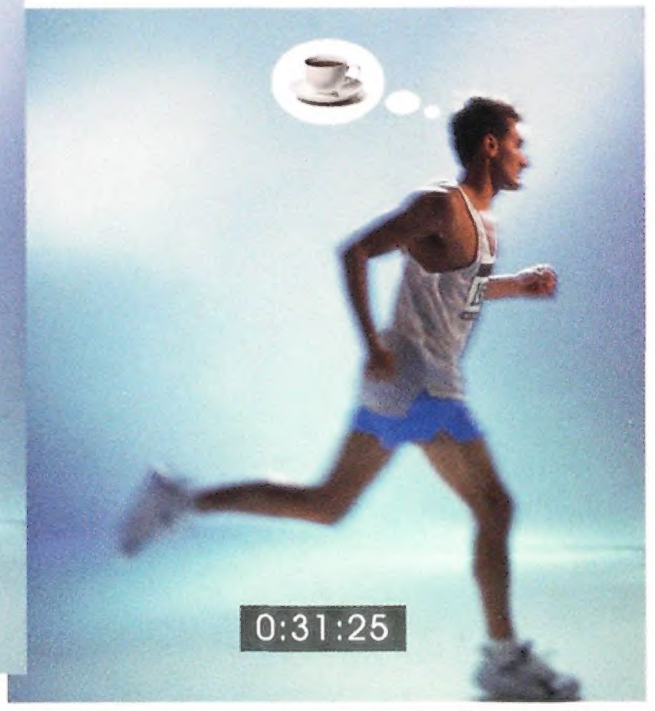

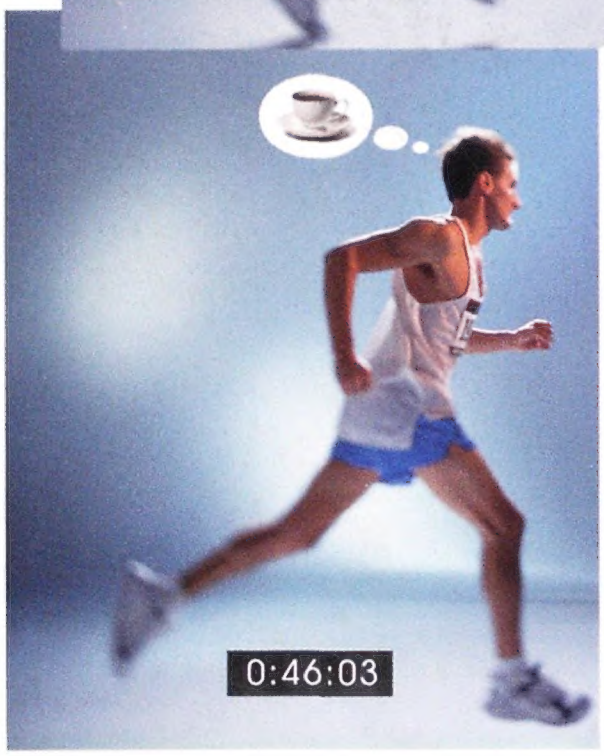

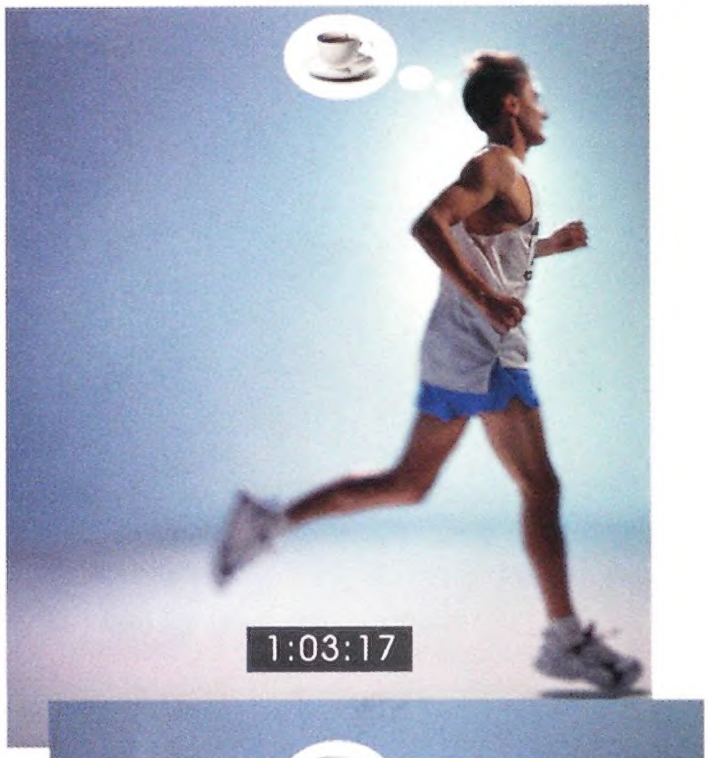

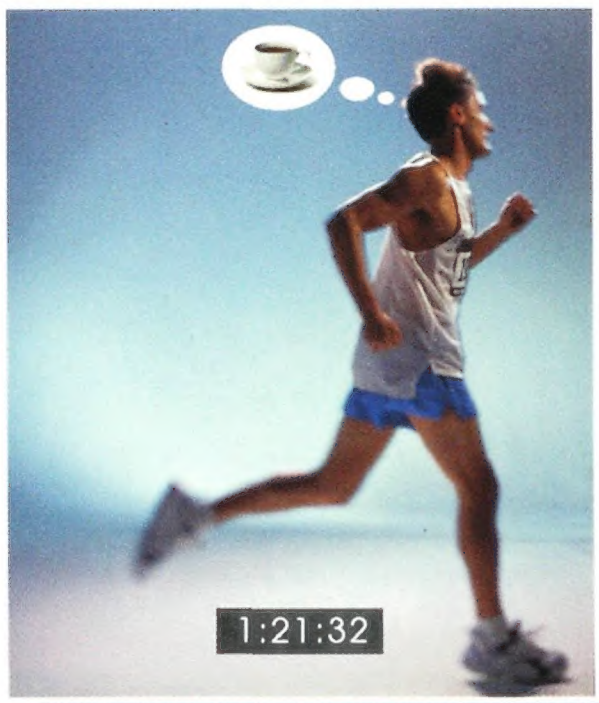

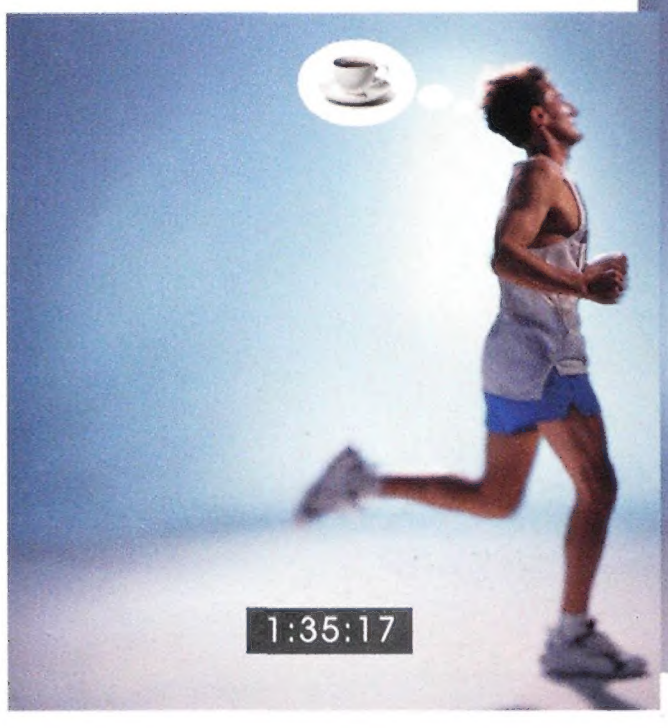

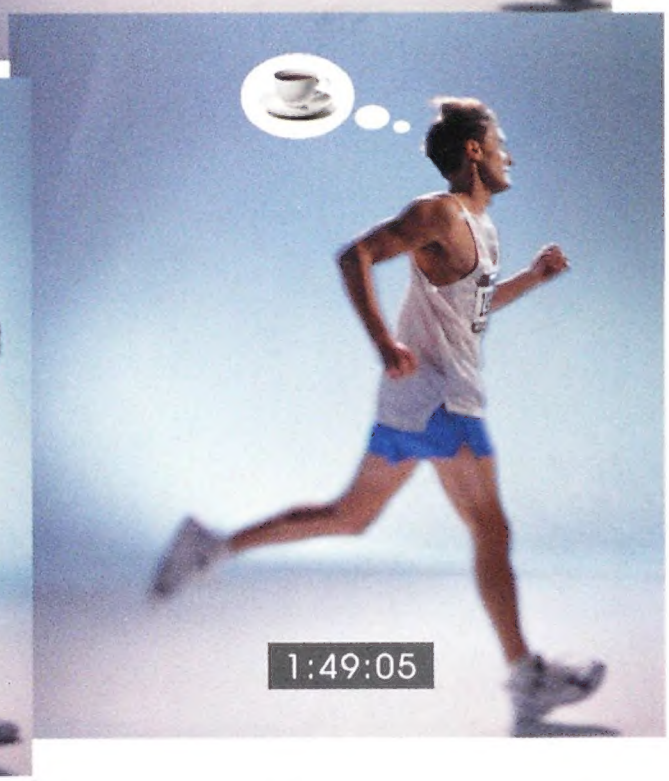

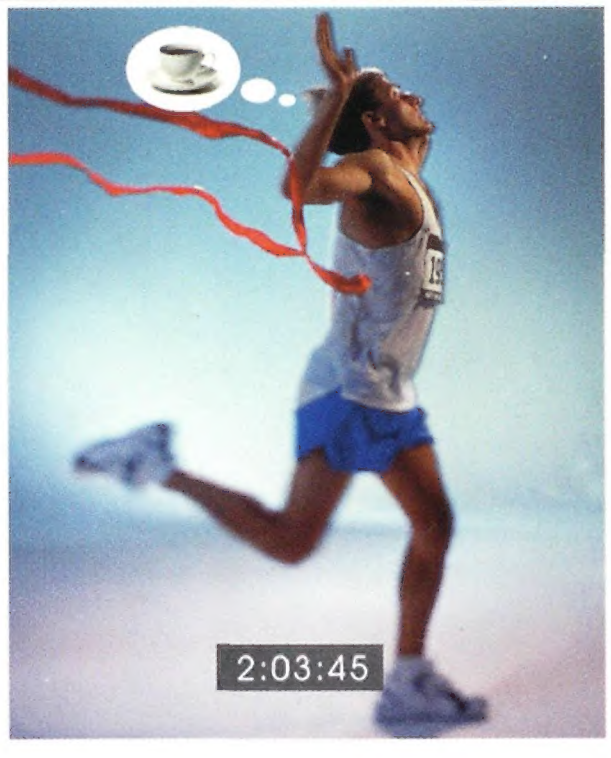

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